

DECEMBER, 1959

Commercial **F**ertilizer and **PLANT FOOD INDUSTRY**



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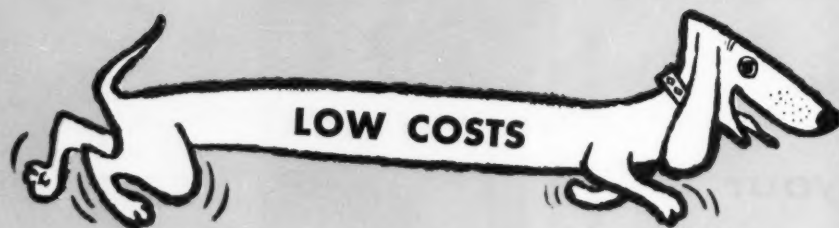
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Commenting **F**reely

by **BRUCE MORAN**

Is farming a business or a way of life? It seems to me we have to decide this, and this coming election year would be a very good time to do so.

If it is a business, the sooner the marginal farm fades away, the better. If it is a way of life, and a good way of life, then some recent political oratory might be justified.

One busily-running candidate has suggested a new USDA department to "aid the two million farm families of chronic low income." The word

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"chronic" is the tip-off. Is this to be another government charity . . . or did he mean to say "rehabilitate"? The candidate, who would like to be President, could be ignorant of conditions or unwilling to face them.

As there are a lot of "chronic" farmers, his idea might be a vote-getter in that group. But sober-minded citizens, with some knowledge of economics, will hardly go along with the idea—benevolent as it may be. For the marginal farmer is doomed. We might just as well face it, and find something else for him to do. That would be a more practical idea, though hardly as romantic and vote-charming as the other.



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RESEARCH

RESULTS & REPORTS

USDA Official Cites Research Need

Research that can save more than \$60 million per year in production costs for farmers in a 38-million acre area is already under way at the new U. S. Department of Agriculture's North Central Conservation Field station, Morris, Minn.

Scope of this research was outlined by Byron T. Shaw, administrator of the USDA Agricultural Research Service, Washington, D. C., during dedication services for the new \$489,989 soil and water laboratory building at the station site.

The \$60 million figure which Mr. Shaw mentioned applies solely to savings farmers can have by eliminating tillage operations on row and grain crops which research will show unnecessary. "Even greater benefits would result," he added, "if we could learn how to save just a fourth of the rainfall now lost through runoff and evaporation."

Fall Application OK For Anhydrous Ammonia

On heavier soils at least, it's entirely okay to put anhydrous ammonia on fields in fall.

University of Minnesota experiments show that applying this fertilizer in fall was just as good as putting it on in spring. Corn yielded just as high and contained just as much crude protein as it did with spring application.

Orchard Cover Crops Need Fertilizer Supplement

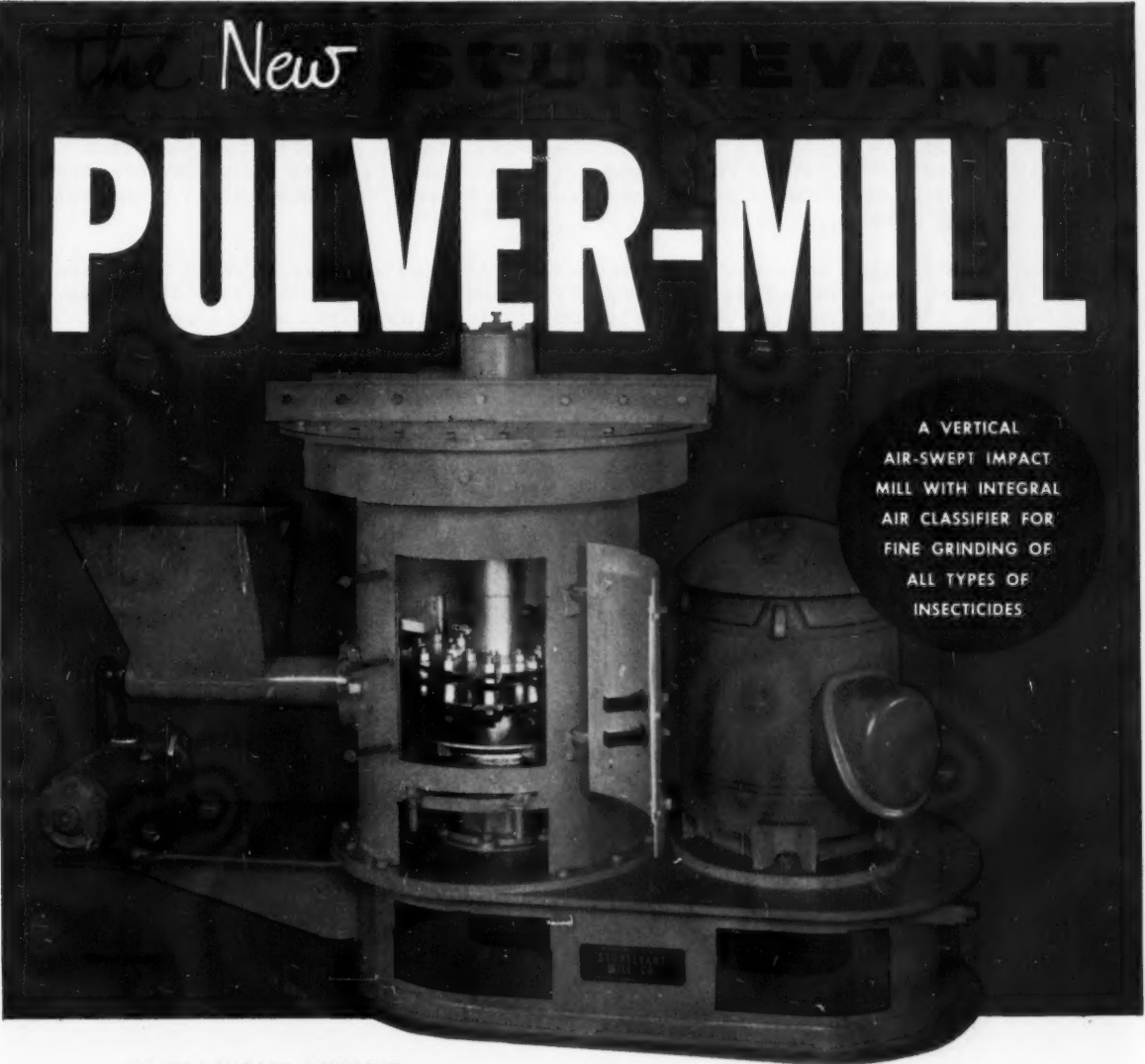
Cover crops in many California orchards have produced no significant evidence of crop yield increase, unless supplemented by commercial fertilizer, according to the California Fertilizer Association.

Citing research trials with orchards which have been continuing since the 1920's at Davis, the principal campus of the University of California College of Agriculture, the Association quotes from the October 1959 "Orchard Letter," prepared by Farm Advisor Walter M. Anderson of the Yuba County Agricultural Extension Service office as follows:

"We formerly grew cover crops in orchards because they were be-

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JUST AROUND THE CORNER

By Vernon Mount



LUDICROUS, if not pathetic were the efforts on the one hand of the Republicans to soften, and the Democrats to aggravate the Great Cranberry Fiasco. Candidates rose from their chairs at banquets, the better for one and all to see that they were consuming cranberries with gusto, and in defiance of the H.E.W. ukase that swept the berries and preserves off grocery shelves across the nation.

OUTRAGED - and justly, were the cranberry people themselves, even though they were remiss in spraying the crop before the harvest, against government orders. They were outraged because a whole industry was bottled up right at the height of the season.

THE MORAL - Government people should have drilled into them an awareness that the smallest pronouncement will be seized upon by the press, magnified out of all reason, and can do serious damage where none was needed nor intended.

HEADS will probably roll around H.E.W. when things quiet down enough for nobody to notice it. And that should be an object lesson to all the denizens of Washington and its way stations.

Yours faithfully,

Vernon Mount

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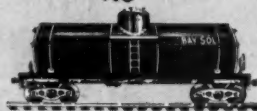
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lieved to make needed plant food available for the trees. When growing annual crops, such as rice or sugar beets, cover crops can increase yields of following crops. Trials with orchards have been continuing since the 1920's at Davis, but show no such increase for orchards.

In the words of Professor Proebsting, "if an orchard is deficient in nitrogen, you had better buy it and not depend on cover crops to supply it."

Molybdenum Need Shown in Crops

This year's soybean harvest will be considerably below last year's crop in both Illinois and Missouri according to early indications. Farmers in many areas throughout these states are reporting yields averaging 20-22 bushels per acre for 1959—in many cases below the break-even point financially. This compares with an average of about 28-30 bushels per acre in 1958.

Lone bright spot in this otherwise discouraging picture is the result obtained in trial plantings where seed beans were treated last spring with molybdenum. Farmers treating with molybdenum are harvesting an average of slightly more than two additional bushels per acre—sufficient in many cases to provide the difference between a loss and a slight profit or break-even point. Approximately 40% of the farmers reporting thus far noted an appreciable degree of yield increase when molybdenum was employed.

Molybdenum has been found in short supply in much of the farmland on Prince Edward Island. This fact was brought to light as a result of soil studies conducted by Keith LeLacheur, an agronomist at the Dominion Experimental Farm at Charlottetown, P.E.I.

Probably the most convenient and inexpensive way to add this important element, is by seed treatment. In this process, a molybdenum compound containing an adhesive is mixed directly with the seed. The molybdenum is then ready to be absorbed by the plant as soon as the seed is placed in the soil. So little of the element is needed that seed treatment for an acre costs as little as 45 cents.

Climax Molybdenum Company—the free world's principal supplier of molybdenum—has sponsored considerable research on the element in the United States. It also just recently developed a special, easy-to-apply form of molybdenum for seed treatment.

HONORS

J. Albert Woods, long a major factor in the fertilizer industry until his recent retirement has been elected a director of Lehn & Fink Products Corp.

* * *

Dr. Karl Folkers was awarded last month the Charles F. Spencer Award for meritorious contributions to agriculture and food chemistry. He was one of those responsible for discovery of the B vitamins. The award was established some years ago by Kenneth A. Spencer in memory of his father. Dr. Folkers has been a member of the Merck & Co. staff since 1934.

* * *

Dr. Reginald H. Painter, Kansas State professor of entomology received last month the Gamma Sigma Delta award for distinguished service to agriculture, during 30 years of teaching and research.

* * *

The Student Agronomy Club of Oklahoma State is winner of this year's American Society of Agronomy annual achievement award. The award was for exceptional activity, and high percentage of membership among eligible students.

* * *

William L. Waring Jr., chairman of Lyons Fertilizer board, Tampa, Fla., has been elected a director of the Marine Bank & Trust Co.

* * *

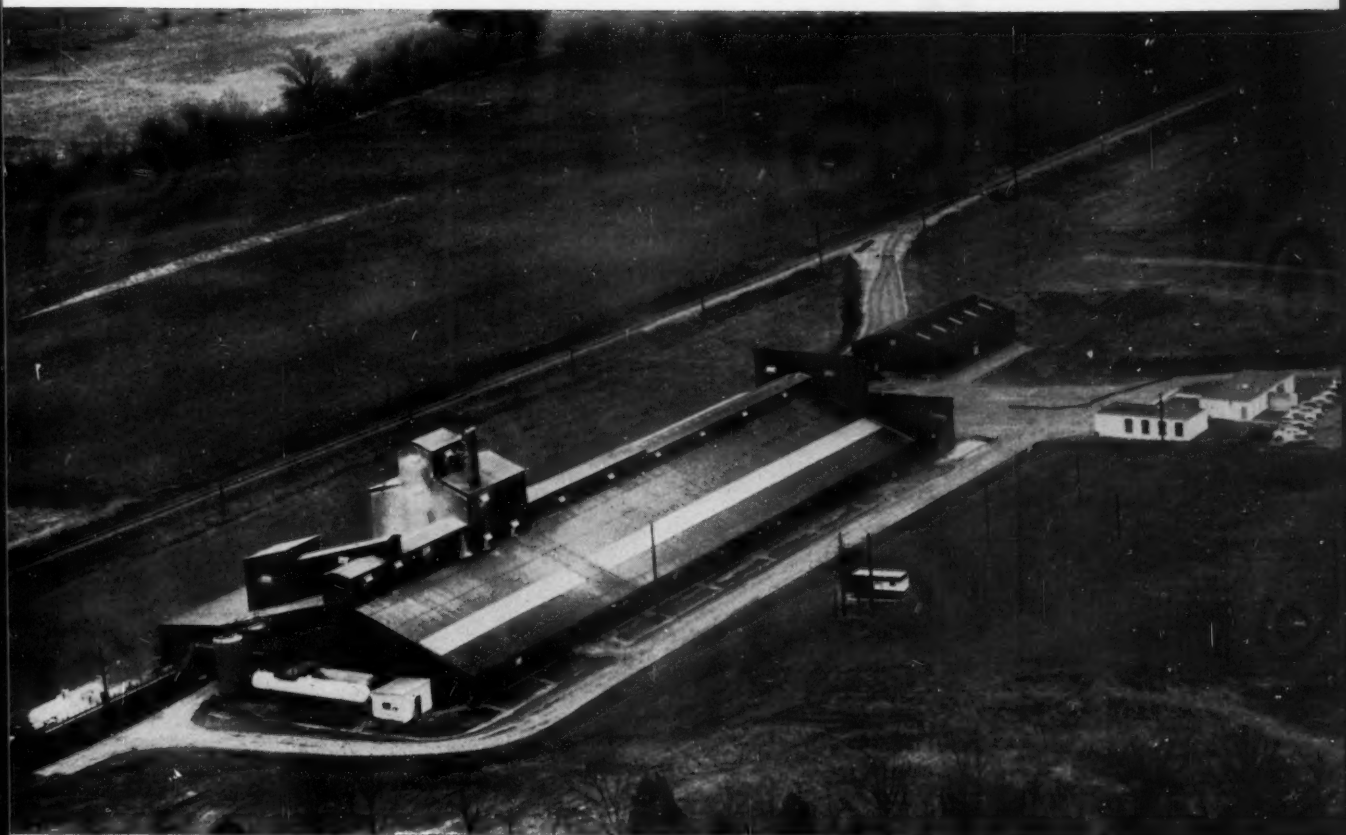
Humphrey G. Rope, agricultural sales director of Fisons, has been elected president of the Fertiliser Manufacturers Association, with **R. B. Risk**, managing director of the Farmers' Company, as vice-president.

* * *

W. D. Gordon, Chilean Nitrate's Mississippi representative was elected president of the State conference of fertilizer manufacturers at their recent Biloxi meeting.

Too Late For Many of Us!

Spencer Chemical has a remedy for wild oats which will be on the market next year some time. It has been tested on 40,000,000 acres infested with wild oats and works fine in the field. But how about us aged delinquents?



A NEW PLANT FOR KENTUCKY . . . A NEW RECORD FOR SACKETT

Here's a brand new granular plant for Kentucky . . . and a remarkable new construction record for The Sackett Company.

Recently completed at Russellville for Cooperative Fertilizer Service of Richmond, this big and fully automated ferti-

lizer manufacturing facility* was built by us in 6 short months.

This is the kind of field performance that Boards of Directors and top management people are looking for . . . the kind they are finding in Sackett . . . *and at the right price, too!*

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WONDERWALL™

cuts bag breakage for Godchaux Sugar



Another major concern, The National Sugar Refining Company's Reserve Division, producers of Godchaux brand sugar at Reserve, La., is now achieving substantial reduction in breakage with WONDERWALL bags.

WONDERWALL, developed by West Virginia, is the remarkable multiwall bag made with the new Kraftsman Clupak* paper. This paper's patented, built-in "stretch" gives it far greater toughness than ordinary kraft.

Mr. Sedgwick Howard, Division General Manager of National Sugar, states:

"Bag breakage has been cut by 51.8% in a series of shipments of more than 600 cars. The addition of an asphalt laminate sheet in our WONDERWALL bag has greatly reduced sugar hardening."

The extra toughness of WONDERWALL really pays off—and it doesn't cost you a cent more; in many cases it actually *reduces* bag expense.

See how WONDERWALLS can cut your bag breakage, and very possibly also reduce your bag cost. Just write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y., or 1400 Annunciation Street, New Orleans 13, La.

*Clupak Inc.'s trademark for extensible paper manufactured under its authority.



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used to make highly concentrated phosphoric acid which, when added to fine rock, makes triple superphosphate. Quality is checked at every stage... the result: a triple with controlled porosity.

Its characteristic: ammoniation rates as high as 5% without evolution of ammonia fumes, yet TREBO-PHOS particles will not take on excess amounts of mois-

ture. The finished product is a dry, drillable, well-conditioned fertilizer. American Cyanamid Company, Agricultural Division, New York 20, N. Y. *TREBO-PHOS is American Cyanamid Company's trademark for its triple superphosphate.



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425 Attend Round Table

An all-time record registration of 416 marked the eighth annual Fertilizer Industry Round Table meeting at Washington, D. C. November 4-6.

The program covered a broad range of topics: plant processes from raw materials to the bag, mechanics of formulation calculations, use of models for blueprints, problems of conventional fertilizers, semi-granular mixtures, statistical quality control, and preneutralization.

A group of the industry's top specialists participated in the discussions, which—in the words of Round Table Chairman Vincent Sauchelli—have been developed through experience around a pattern suited to the needs of Round Table Members. With a phenomenal growth such as the meeting has seen, he told the group, it is difficult to retain the spontaneity of the early gatherings, and he urged everyone present to submit questions and comments to the committee.

At the business session, the Round Table committee was unanimously reelected to carry on with the program for another year: Vincent Sauchelli, National Plant Food Institute, Washington; Albert Spillman, Fertilizer Manufacturing Cooperative, Baltimore; Joe Reynolds, Jr., Davison Chemical Company division of W. R. Grace & Co., Baltimore; and H. L. Marshall, Olin Mathieson Chemical Corp., Baltimore, who was named to permanent secretary-treasurership of the committee.

The committee explained that the registration fee (which constitutes membership in the informal Round Table organization) was hiked to \$7.50 per person this year to cover the increased costs of printing and distributing copies of the proceedings, which record not only all the papers presented, but also the questions, answers and comments that constitute such an informative portion of these sessions.

Upon vote of the body, plans were confirmed to hold the meetings at Washington, D. C. again next year, at the Mayflower Hotel on November 2-4, with registration beginning on the preceding evening as usual.

Round Table committeemen took turns presiding at the sessions, with Al Spillman conducting the initial

morning program, which dealt with 'Plant Processes from Raw Materials to the Bag.' Ted Clegg and Elgin Doidge of Canadian Industries Ltd., Montreal, presented a thorough study of the organizational structure and operating procedures of their Agricultural Chemicals Division, which operates seven fertilizer plants in Canada.

Illustrating their talks with slide films, they analyzed in detail the patterns of line and staff authority and responsibility, showing actual copies of internal company production reports and describing the uses to which each piece of information was put.

In addition, they outlined the recent conversion of three of their plants to a granular operation, telling in each case how the new equipment was linked in with the existing operation, and why each decision was made to connect the two facilities in that way. They carried the discussion a step further to relate the company's subsequent experience with the results of each installation, and told what would be done differently if they had each one to do over again.

Detailed specifications on the equipment in use at each plant were given, with special emphasis on dryers, coolers, screens, and dust and fume control equipment. Surprising to many of the granulating plant operators in the audience were the relatively low in-plant materials shrinkage rates indicated for the CIL plants: 0.3% on conventional ammoniated goods, with an increase to only 1.59% in the granulating plants.

On the same topic, Al Henderson of Wilson & Toomer Fertilizer Co., Jacksonville, Fla. described the new high-capacity granulating unit which they have installed. He was assisted in his presentation by Allen Jackson of Fertilizer Equipment Sales Corp., Atlanta, who made the installation, and Enrico Rife of Productora de Superfosfatos, Havana, Cuba, which has a similar unit.

One of the unusual features of the operation is the use of an 11-ft. sparger in a 12-ft. ammoniator; the center-fed sparger is designed with the exit holes following a spiraling pattern around the pipe. Among Mr.

Henderson's statements which stirred the most questions were these: no overformulation is practiced, even on nitrogen; and some grades are dried-down only to something above 5% moisture content, with no handling problems even in the humid coastal atmosphere.

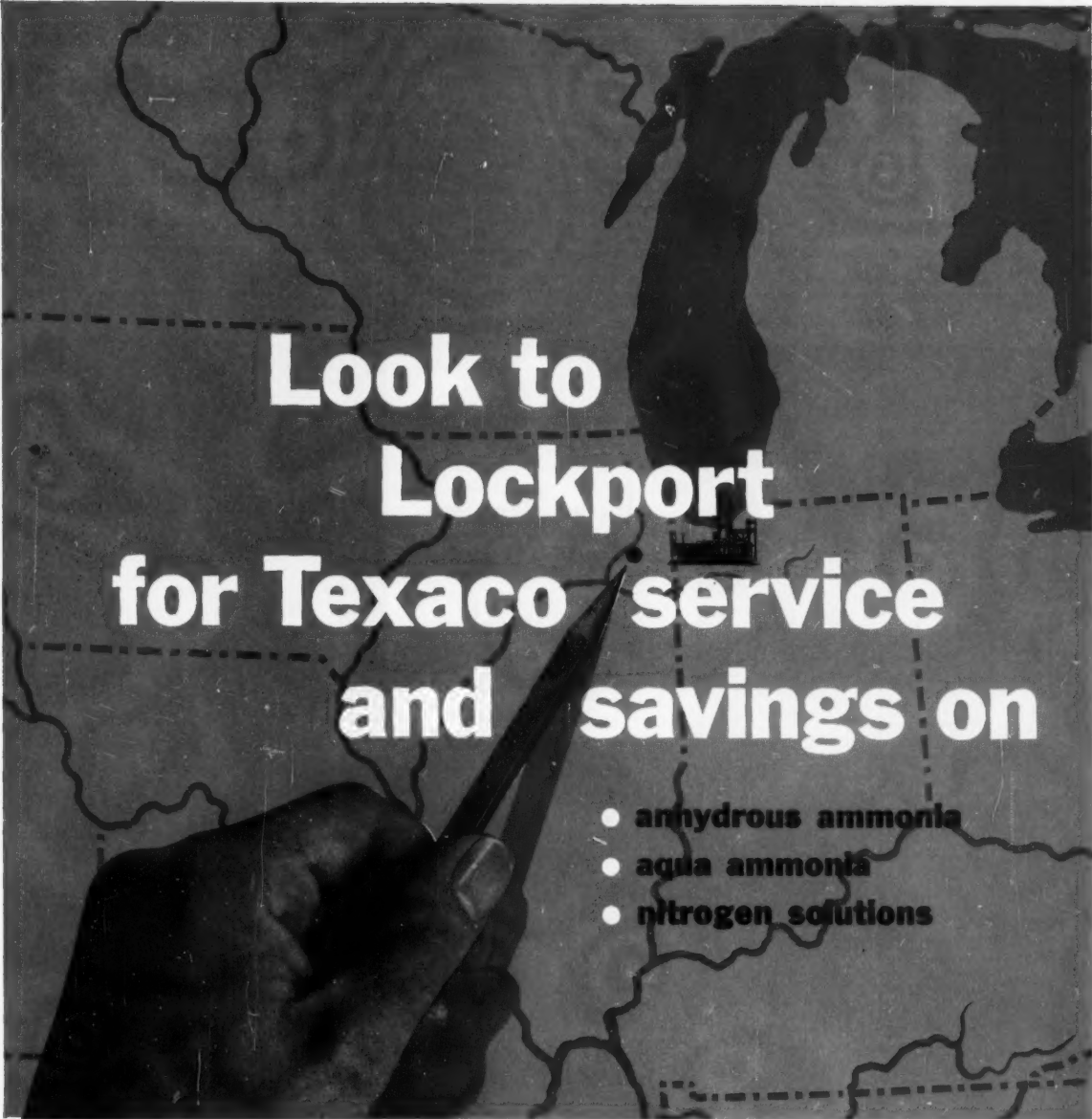
On the 'Mechanics of Formulation Calculations' panel were Bill Tucker of G.L.F. Soil Building Service, Ithaca, N. Y.; Joe E. Reynolds, Jr., of Davison Chemical Co. division of W. R. Grace & Co., Baltimore; Ted Schmalz of F. S. Royster Guano Co., Norfolk; and Bert Tucker of Sohio Chemical Co., Lima, Ohio.

Leading off, Bill Tucker reviewed the calculations required to come up with a starting formula for production in a granular operation. Reducing the problem to three steps, he included four parts in the initial step: assess the materials on hand, listing nutrient analysis and moisture content as determined either by the supplier's analysis or the company lab analysis; decide on ammoniation rates to be used; decide on plant food overages to be allowed; and decide on the moisture content to be tolerated in the end product.

His second step was to set up and solve the necessary equations which reflect these known facts, assumptions and end-product requirements. The third step was to complete, extend and check the formula against the original requirements.

Illustrating with an 8-16-16 formulation problem, Mr. Tucker proceeded to set up a formula deriving all 8 units of nitrogen from solution, using an ammoniation rate of 5.8 lbs. per unit of P_2O_5 for normal superphosphate, 3.5 lbs. for triple super, and 7.2 lbs. for phosphoric acid; he allowed one percent overages for P_2O_5 and K_2O , and six percent for N, with an end-product moisture content of one percent.

Considering the potash to be essentially dry and the 44%-N solution at six percent water, he arrived at 1087 lbs. dry-basis for the three phosphatic materials, and set up three equations with the three unknowns. Solving one equation and substituting in the others, he determined that 97 lbs. of phosphoric acid, 237 lbs. of triple super and 827 lbs. of ordinary super would be



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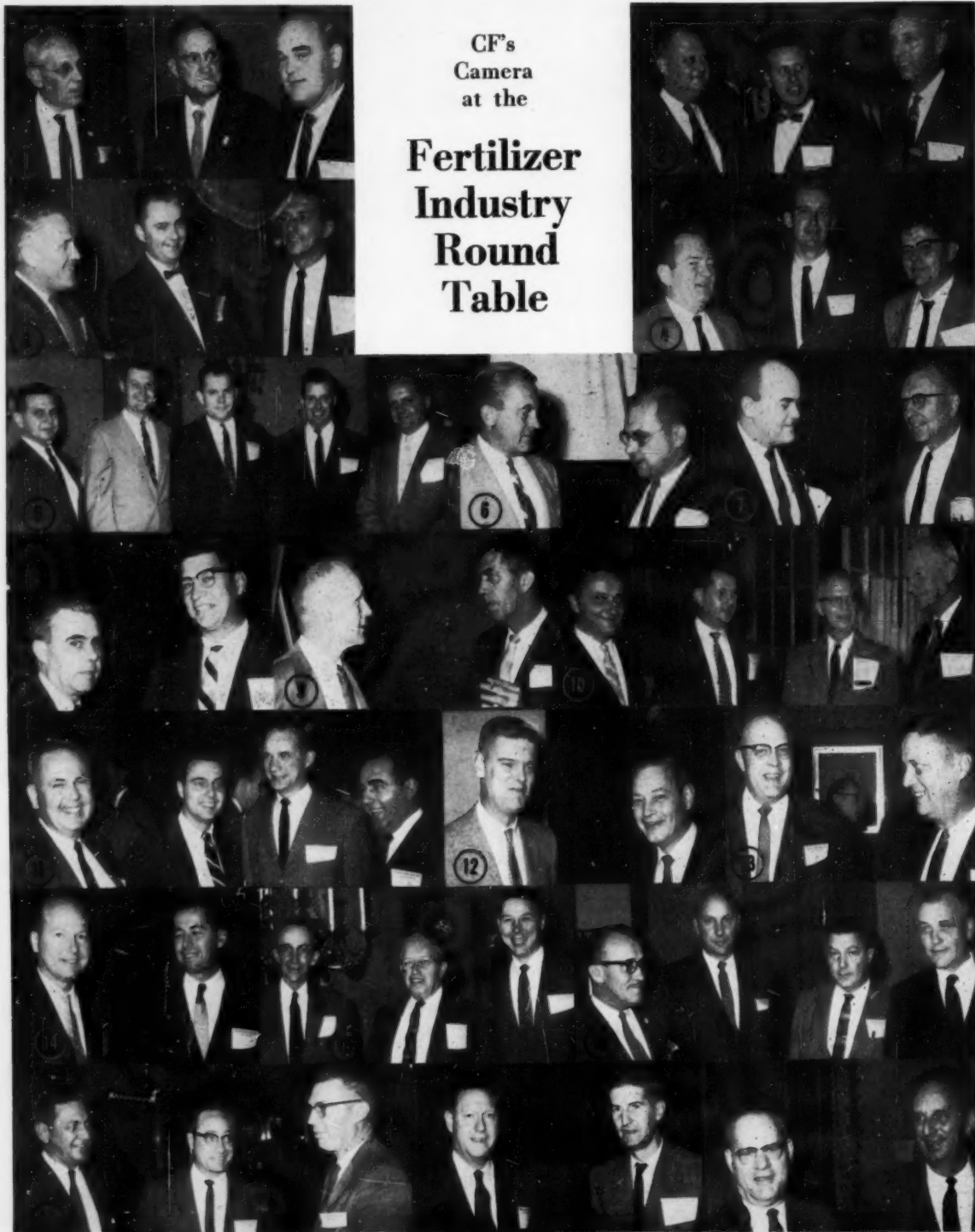
1. Albert Spillman and Harry L. Fader of Fertilizer Manufacturing Cooperative, Baltimore; and Bill Tucker, G.L.F. Soil Building Service, Ithaca, N. Y.
 2. Larry Hein, Olin Mathieson Chemical Corp., Joliet, Ill.; Barney Tatum, U.S. Phosphoric Products, Tampa; and Rodger Smith, Eastern States Farmers Exchange, W. Springfield, Mass.
 3. Clare Graft, Ketona Chemical Corp., Birmingham; Jim Furth, Nitrogen Division, Allied Chemical Corp., Metuchen, N. J.; and Herb Mackay, Hubbard-Hall Chemical Co., Waterbury, Conn.
 4. Joe Markay, Tennessee Corp., College Park, Ga.; Allen Jackson, Fertilizer Equipment Sales Corp., Atlanta; and Frank Doody, Darling & Co., Chicago.
 5. Ed Kapusta, U. S. Borax & Chemical Corp., New York; John Surber and Sam Shelby of Federal Chemical Co., Louisville; Bob Vess, U. S. Steel Corp., Pittsburgh; and Joe Prosser, A. J. Sackett & Sons Co., Baltimore.
 6. J. B. Sturgess, Collier Carbon & Chemical

Corp., Los Angeles, and Frank Nielsson, International Minerals & Chemical Corp.
 7. Bill Tucker, G.L.F. Soil Building Service, Ithaca, N.Y., and Raymond Myers, Eastern States Farmers Exchange, York, Pa.
 8. Curtis Cox, Virginia-Carolina Chemical Corp., Richmond, and Bo Gillette, Texas Gulf Sulphur Co., New York.
 9. Elmer Perrine, Nitrogen Division, Allied Chemical Corp., New York, and Bill Newsom, International Minerals & Chemical Corp., Mulberry, Fla.
 10. George Wiczorek, Robert L. Bristow and John Hardesty, all with U.S.D.A., Beltsville, and William J. Cuming of Commonwealth Fertilizers in Australia.
 11. Ed Causey, International Minerals & Chemical Corp., Atlanta; Ed Kingsbury of Indianapolis and Harvey O'Neill of Peru, Ind., both with Kingsbury & Co.; and Chuck Everhart, U. S. Industrial Chemicals, Danville, Ill.
 12. Don Moffatt, United Cooperatives of Ontario, W. Toronto, and Phil Turner, DuPont, Toledo.

13. Phil Stocker, Land O'Lakes Creameries, Minneapolis, and Bert Tucker, Sohio Chemical Co., Lima, O.
 14. Loy Everett, Commercial Solvents Corp., New York, and Quentin Lee, Cotton Producers Assn., Atlanta.
 15. J. H. Ferguson and T. J. Bosman of Federal Chemical Co., Nashville, Tenn.; and Henry Klosky, Baugh Chemical Co., Baltimore.
 16. Walter Sackett, A. J. Sackett & Sons Co., Baltimore; Tom Hoshall, Farm Fertilizers, Omaha; John Stark, G.L.F. Soil Building Service, Hamilton Square, N. J.; and Joe Sackett, A. J. Sackett & Sons Co., Baltimore.
 17. Mercer Rowe, Ashcraft-Wilkinson Co., Atlanta; Jim Paul, Escambia Chemical Co., Atlanta; and 'Red' Williams, Fertilizer Equipment Sales Corp., Atlanta.
 18. Les Clegg and Elgin Doidge, Canadian Industries Ltd., Montreal.
 19. Willis Buie, Canada Packers Ltd., Toronto, and Harold Barton, International Fertilizers Ltd., Quebec.

CF's
Camera
at the

Fertilizer Industry Round Table



used. With allowances for water lost in drying, this brought the total materials input to 2077 lbs. for an end product of 1980 lbs. solids and 20 lbs. water.

Mr. Schmalz outlined methods employed methods employed by his firm in formulation which eliminate trial-and-error practices and account specifically for moisture and materials losses, he said. The procedure is based on the product more than the materials used; with formulation for an end-product moisture content of one percent, he explained how all materials are converted to a one percent moisture basis and allowance for moisture content above that level is automatically adjusted in the formulation input of each material.

Mr. Schmalz described the analysis tables they had prepared for various moisture contents of superphosphate, triple super and acid, along with the nitrogen solutions they use. As an illustration, he reproduced on the blackboard a complete formula of various materials, with adjustment factors for variations in water content of the materials, plus those for in-process losses.

This simplified procedure, Mr. Schmalz concluded, has enabled management to maintain a close control of inventory and process losses.

Bert Tucker introduced some new triangular graphs developed by his company for selecting the optimum combination of materials furnishing the same plant nutrient for a product with a given set of characteristics. He explained that formulation is getting more and more complex with as many as three separate materials furnishing a single plant nutrient in many formulations.

While triangular diagrams appear at first glance somewhat complex, he said, they can actually simplify formula calculations considerably, taking the guesswork out of adjustments that must be made when any factor is altered. Taking a given ammoniation rate, he plotted a point on one of the triangular charts and varied the proportions of nitrogen materials, describing effects on the process and the product which each variation would give.

Mr. Reynolds gave some additional procedures in formula calculation, and summarized the problems involved in this phase of manufacturing fertilizers.

On the second day's program, problems of conventional pulverant

fertilizers were considered, then attention was turned to semi-granular mixtures.

John O. Hardesty of U. S. Department of Agriculture, Beltsville, spoke on physical condition of mixed goods. Moisture content probably has more to do with controlling the condition than any other single factor, he said, but other factors which must be considered are: proportion of soluble salts in solution, chemical reaction, temperature, number of contacts between particles in storage (size and shape of the particles), and mechanical pressure (height of storage pile, etc.).

He discussed the factors that govern rapid and satisfactory curing, and the ones which promote a satisfactory physical condition in the package; these two goals demand different sets of characteristics, he stated, which are inversely related to one another. Responding to a question about use of conditioners, Mr. Hardesty reported good results from their studies in many tests, but said they had found conditioners of little value when caking was severe.

Extending the topic of physical condition to the use of urea-ammonium nitrate solutions, Bert Tucker stated that urea seemed to alter the structure of ammonium chloride crystals formed in the mixture from a fren-like pattern to a cubed pattern. Some 20 lbs. of urea per ton of end product is required, he said, to give the effect of softening the product and reducing bag set. In response to questions, he said that as a general rule 50 lbs. of urea per ton of end product appeared to be near the upper limit, when using the material in conjunction with ammonium nitrate, and said that very little had been published on results achieved with four-component solutions.

George Gilliam of Allied Chemical Corporation's Nitrogen Division, Hopewell, Va., discussing the effect of four-component solutions on pulverant fertilizers, said the addition of urea to the solutions used offered a higher fixed-to-free ammonia ratio and a lower salting-out temperature for a solution with the same nitrogen content. In addition, he said, use of a solution of this type meant that fewer raw materials are required to get a well-conditioned product. Also, he added, there is better dispersion of the nitrogen after the free ammonia has been removed by reaction, and the product tends to form fewer crystal bridges

in storage, and requires less drying.

Bill Lewis of DuPont, Wilmington, Del., speaking on the effect of urea-ammonia-water-ammonium carbamate solutions, said that reaction of the ammonium carbamate frees ammonia and carbon dioxide, and that the latter of these absorbs heat and aerates the ammoniator mass and keeps out moisture. He discussed ammoniation rates, explaining that as the P_2O_5 ratio in the grade goes up, the reversion rate increases, too; old goods, stored through a complete season, can revert even though cooled down, he stated.

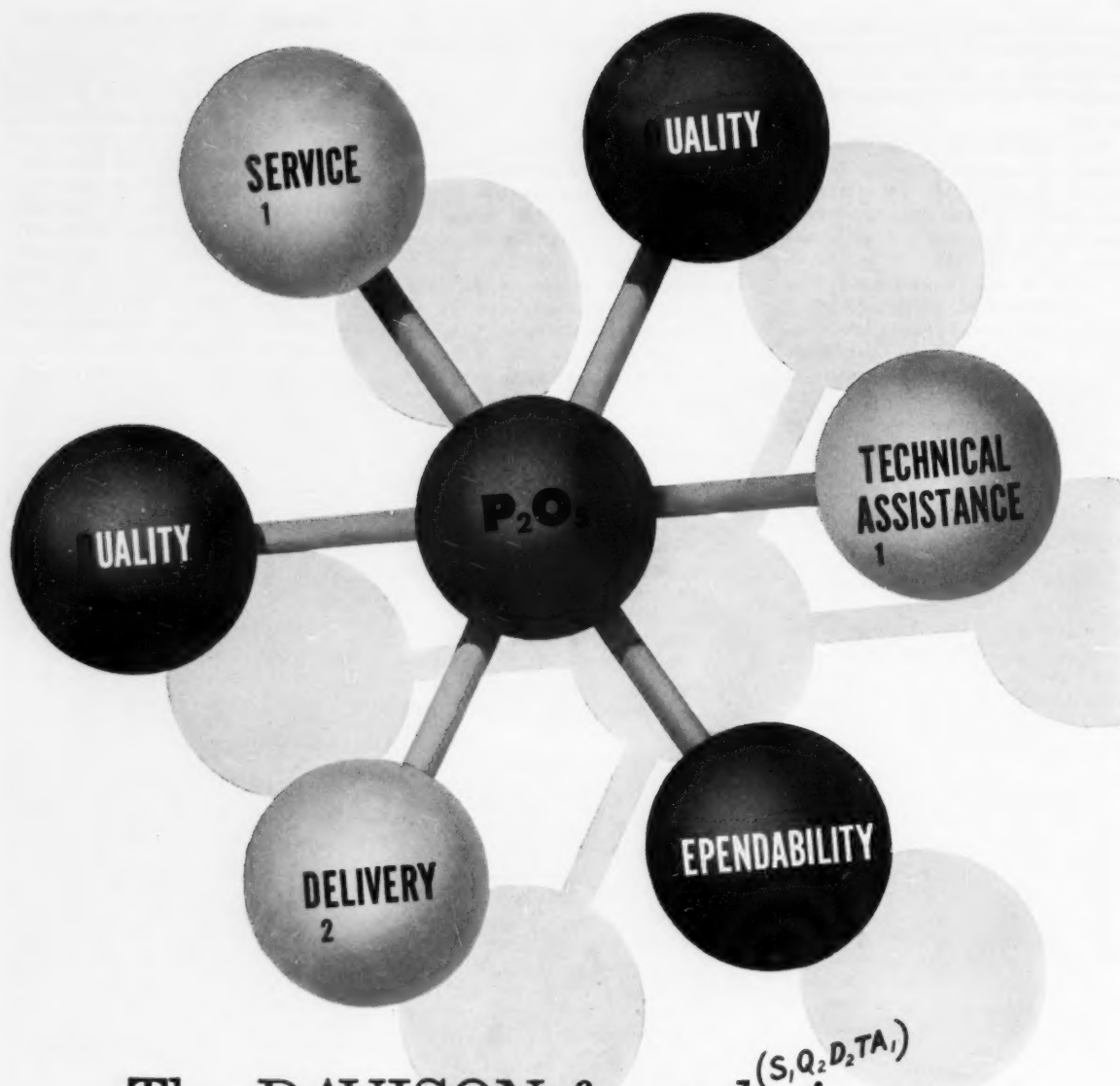
Segregation problems of conventional fertilizers was the topic of W. L. Hill of U. S. Department of Agriculture, Beltsville. He outlined the causes of segregation, beginning with the stratification of single materials in storage piles, and describing its effect on the successive mixtures, as the pile is worked down and the finer materials toward the bottom are used.

He discussed pouring segregation, pile segregation, and vibration segregation, illustrating his talk with charts. Mr. Hill related porosity, between-particle channelways, and other factors to the problem of stratification in the mixture.

Leading off on the topic of mixers, Walter Sackett of A. J. Sackett & Sons Co., Baltimore, described a new gravity mixer for dry blending of materials which his firm has developed. Illustrating the blending action with a series of color slides, Mr. Sackett stated that this type mixer was effective and low in cost, while offering the additional advantages of remote control, low maintenance, and low noise.

Harold Krueger of Stedman Foundry and Machine Co., Aurora, Ind. talked about rotary batch mixers and their uses in dry mixing, mixing-ammoniation, and mixing-ammoniation-granulation. Of the charging time for a mixer, he said this would vary with the location and design of the holding hopper and the size of the batch; if the hopper is located directly above the mixer intake and has no angle flatter than 60°, the mixer should charge in eight seconds for a ½-ton batch, 12 seconds for 1-ton, 16 seconds for 1½-ton, and 20 seconds for 2-ton batches.

As for mixing times, he said a maximum of one minute should be ample for ½-ton to 2-ton batches in dry mixing; although mixing time in ammoniation will vary with de-



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Arcadian® News

Volume 4

For Manufacturers of Mixed Fertilizers

Number 12

Technical Tips for Better Ammoniation

NEW WAY TO PREVENT BAG SET



While conducting pilot plant studies on the use of the pre-reactor to make high analysis fertilizers, Nitrogen Division experts also ran bag storage tests. Producers will find the results of these tests most interesting. Details—including the formulation and processing data for each product made—are given below:

Four Formulations

Four grades were made: 14-0-14, 16-0-8 and two 16-8-8 formulations. The 14-0-14 and 16-0-8 materials were made with a nitrogen solution composed of: 19% ammonia, 72.5% ammonium nitrate, 8.5% water, and a total nitrogen content of 41%. Sulphuric acid was used to neutralize the free ammonia. Regular, no-granular muriate of potash was the source of K_2O , and dolomite was used for filler. Dolomite particle size was about 80% through 200 mesh.

One of the 16-8-8 formulations (16-8-8A) used the same raw materials as above, with the addition of normal

TABLE NO. 1 — FORMULATIONS — POUNDS PER TON

Fertilizer Grade	14-0-14	16-0-8	16-8-8A	16-8-8B
Formula				
Nitrana 4M (19NH ₃ , 41N)	693	790	801	—
Nitrana 7 (25.3NH ₃ , 45N)	—	—	—	735
Normal Super (18.96 A.P.A.)	—	—	560	646
Triple Super (44.1 A.P.A.)	—	—	133	—
H ₃ PO ₄ (58.2)	—	—	—	89
H ₂ SO ₄ (93)	412	465	353	389
KCl (60 K ₂ O)	473	270	270	270
Dolomite	490	555	20	20

and triple superphosphate to supply the missing P_2O_5 . In the case of the 16-8-8B product, the nitrogen solution used contained 25.3% ammonia, 69.2% ammonium nitrate, and 5.5% water—with a total nitrogen content of 45%. Normal superphosphate and wet process phosphoric acid supplied the P_2O_5 . Other raw materials for both of these 16-8-8 formula-

tions were the same as in the 14-0-14 and 16-0-8 products.

Of the materials charged in making these four products, ammonium nitrate—considered by many to be the most influential factor in caking—varied from 502 pounds per ton (14-0-14) to 580 pounds per ton (16-8-8A). See Table 1.

(Continued on following page)

(Continued from preceding page)

For all four formulations, the basic process equipment used included: a pre-reactor, pug mill mixer, dryer, cooler, screens and a crusher. Total throughput capacity was about 1000 pounds per hour, giving a production rate of 500 pounds of product per hour at a 1 to 1 recycle ratio. Product size was taken as minus 6 plus 20 mesh.

In making the 14-0-14 and 16-0-8 grades, all of the nitrogen solution and acid were processed through the pre-reactor and overflowed continuously as a slurry to the pug mill at a temperature of 291°F and a water content of 5.8%. When this slurry combined in the pug mill with the muriate of potash, dolomite and recycle the resulting mix had a temperature of about 185°F and contained 2 to 3 per cent water. From the pug mill the mixture passed to the dryer where moisture was reduced to 1% or less. Material from the dryer then went to the cooler, and from there to the screens. Oversize material was diverted to the crusher. The product size was taken out and fines were returned to recycle.

While processing the 16-8-8 products, a portion of the nitrogen solution was fed to the pug mill to ammoniate the superphosphate. The remainder of the nitrogen solution, all of the sulphuric acid, and (for the 16-8-8B product) the phosphoric acid were fed to the pre-reactor.

Conditions in the pre-reactor for the 16-8-8A formulation were basically the same as for the 14-0-14 and 16-0-8 grades. However, for the 16-8-8B formulation, a somewhat higher slurry moisture and a slightly lower pre-reactor slurry temperature were used. Other 16-8-8B process conditions—in the dryer, cooler, screens and crusher—remained

TABLE NO. 3—BAG STORAGE TESTS								
Fertilizer Grade	14-0-14		16-0-8		16-8-8A		16-8-8B	
% Kaolin Coat (1)	0	2	0	2	0	2	0	2
Initial Moisture, %	0.69	0.60	1.01	0.90	0.44	0.48	0.28	0.40
Inspections and Grade (2)								
30 day	D	A	D	B	A	A	A	A
90 day	D	B	D	B	A	A	B	A
180 day	—	B	D	B	B	B	D	B
Final Moisture, %	—	0.93	1.03	1.05	0.79	0.86	0.93	0.97

(1) Kaolin Clay—Specific surface of about 16,000 cm²/gm.

(2) Grading Code—A—Free flowing when bag is removed from pile.

B—Free flowing after one 3-foot drop on flat side.

C—Lumps remaining after one 3-foot drop on flat side.

D—Two or more 3-foot drops required to break bag set.

the same. For process operating conditions in detail, see Table 2.

Clay Coating Tested

To determine the effect of a coating agent on product storage characteristics, equal amounts of product in each grade were coated with a 2% clay coat to supply material for comparative testing of coated and uncoated products. A kaolin type clay with a specific surface of about 16,000 cm² per gram was used. However, other clays or kieselguhrs with equivalent total surface would probably serve just as well for this purpose.

Test Ran For 6 Months

Storage data on bags of coated and uncoated products were obtained over a six month storage period. All test bags, of 5-ply construction (3 paper and 2 inner asphalt liners), were the 100 lb. size. They were positioned two and three bags up from the bottom, in piles twelve

bags high. The storage area was a one story unheated cinder block building with a concrete floor.

Each test bag was inspected and graded for degree of caking at the end of 30, 90 and 180 days of storage. The uncoated 14-0-14 and 16-0-8 products, having an initial moisture content of 0.69% and 1.01% respectively, were found to be severely caked at each of the inspection periods. These products had a hard bag set requiring two or more drops of the bag on the flat side from a height of about three feet to break bag set. From this it would be natural to expect that both of these products would cake rather severely in either bulk or bag storage. Somewhat lower initial moistures could be expected to improve storage condition.

The coated 14-0-14 and 16-0-8 products, having about the same initial moisture as the uncoated, showed essentially no caking over the entire test period. Inspection after 30 days showed that the 14-0-14 was free-flowing, and that the 16-0-8 had only a slight bag set, requiring only one drop of the bag to make it completely free-flowing. After 90 and 180 days, both products were in the same condition as the 16-0-8 at 30-day inspection.

16-8-8 Fares Better

The 16-8-8 products, having a somewhat lower initial moisture, showed good condition, with the exception of the uncoated 16-8-8B at the 180 day inspection. Both the coated and uncoated 16-8-8A and the coated 16-8-8B were free-flowing after 30 and 90 days of storage, and showed only a slight bag set after 180 days of storage. The uncoated 16-8-8B was free-flowing at 30 days, had

TABLE NO. 2—OPERATIONAL DATA

Fertilizer Grade	14-0-14	16-0-8	16-8-8A	16-8-8B
Temperatures °F				
Pre-reactor Slurry	291	291	293	284
Dryer Feed	187	183	176	144
Dryer Product	187	171	199	185
Cooler Product	140	136	158	129
Moistures %				
Pre-reactor Slurry	5.8	5.8	5.8	6.5
Dryer Feed	2.1	2.6	2.3	2.7
Product Out	0.2	1.0	0.4	0.3

a slight bag set at 90 days, and was severely caked after 180 days of storage. See Table 3.

Where Coating IS Needed

Results of these tests indicate that X-O-X fertilizers (no P_2O_5) made by the pre-reactor process should be dried to a very low moisture level, preferably below 0.5%. In addition, they should be coated with an inorganic coating material such as clay or kieselguhr in order to have good condition in storage. As regards NPK grades made by this process, good storage condition would be expected, provided the product is dried to a very low moisture level, preferably below 0.5% or less. The addition of a coating would be beneficial, but it is not as important as for the X-O-X grades.

Nitrogen Division PILOT PLANT is Modernized

The finishing touches in the extensive modernization of Allied Chemical Corporation's Nitrogen Division pilot plant have just been completed. New and re-designed equipment and facilities make this famous research and development center capable of testing just about every type of fertilizer manufacturing technique imaginable.

The original Nitrogen Division pilot plant has contributed advance after advance to the technology of ammoniation processes for semi and full-granular mixed fertilizer. Many other products, now serving farmers and homeowners, have benefited as well.

To Serve You Better

A full staff of experienced engineers and technicians at Nitrogen Division's pilot plant, working closely with technical service people in the field, has always been available to mixed goods producers. Now—with new and additional plant facilities covering a wider range of manufacturing techniques, this pilot plant service has become even more valuable for producers. So, if you have a formulation or manufacturing problem in your plant, be sure to take advantage of this expert assistance. There's no obligation. Write Technical Service, Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.



Corn is a heavy user of sulphur. So are cotton, legumes, onions and cabbage. Some crops need more sulphur than phosphorus. Many soils are running out of sulphur fast. It pays to tell farmers your mixed fertilizers contain sulphur.

SULPHUR IS A BONUS VALUE IN YOUR MIXED FERTILIZER

It will pay you and your dealers to tell farmers about the big extra benefits they get from the sulphur you put in your mixed fertilizers. Farmers pay for a guaranteed content of nitrogen, phosphoric acid and potash. At no extra cost, you also give them sulphur which is a vitally important plant food. Many farmers are not aware of this fact. They do not realize the need for sulphur in crop production until serious deficiencies appear in their soils.

The fertilizers you make with ammoniated superphosphate are a rich source of sulphur. Normal superphosphate contains more sulphur and more calcium than phosphorus. When you use sulphuric acid to neutralize "excess" ammonia in producing high-nitrogen mixtures, you add sulphur to your fertilizer. And, of course, sulphate of ammonia in fertilizers supplies sulphur for crop production.

Depending on your production technique, it is easy to calculate the amount of sulphur your mixed fertilizer contains.

Make this a sales point! Tell your customers they are getting valuable quantities of sulphur and paying nothing for it except transportation costs. This is a big extra bonus!

Leading Crops are Heavy Users

Crops, on the average, remove about as much sulphur from the soil as they do phosphorus. Yet the average soil contains only half as much sulphur as phosphorus. Cotton, corn, tobacco, legumes, grass, onions and cabbage are heavy users of sulphur and require considerable amounts for high yields.

Sulphur disappears fast, if it is present in the soil. Leaching can remove 30 to 60 pounds per acre per year. Erosion often removes six pounds of sulphur per acre per year. On most farmland, leaching and erosion carry off much more sulphur than rainwater adds to the soil.

If your mixed fertilizers contain sulphur, you and your dealers can profit by bringing this fact to the attention of your farmer-customer. SULPHUR can be a SALES-MAKER for YOU!

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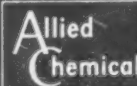
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	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES			
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	-7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
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A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

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sign of sparger pipes and pressure on the solution measuring boot, 1½ to two minutes should suffice, including 20 to 30 seconds mixing time after all solution has entered. For mixing-ammoniation-granulation, Mr. Krueger had these general rules for mixing time after all materials, liquid and solid, have been introduced: one minute for ½ ton, 1½ minutes for one ton, and two minutes for 1½ or two tons.

He had some additional recommendations and advice about mixer design, operation and maintenance.

R. E. Robinson of Atlanta Utility Works, East Point, Ga. continued with the subject of the rotary drum mixer for batching operations.

He explained that the flighted rotary drum mixer emerged as the predominant type in the fertilizer industry because large batches and high tonnages could be handled with good uniformity in a minimum of mixing time; life of the equipment is long; it can be charged and discharged easily; capital outlay, power requirements, and maintenance and operating costs are all relatively low.

Discussing dry mixing, mixing-ammoniating, and mixing-ammoniating-granulating, Mr. Robinson covered operating procedures, spray system design, installation and maintenance of the mixers.

A representative of Haynes Stellite Co. appeared at this point on the program to offer suggestions on handling and use of Hastelloy C in sparger pipes.

W. A. Lutz of Dorr-Oliver spoke on use of models instead of blueprints in plant design, illustrating with two actual scale models of plants his company had built, a phosphoric acid plant and a granular triple superphosphate plant. He pointed out the ease and rapidity with which alterations in design and location could be made, and how the three-dimensional effect helped to eliminate awkward arrangements in the set-up. Admitting that there may be disadvantages to models, he stated that the only two they had found were that they can't be folded and mailed, and are difficult to file in a cabinet.

A panel on semi-granular mixtures featured Elmer Perrine of Allied Chemical's Nitrogen Division, New York; Royster's Ted Schmalz; George Walton of Tennessee Corp., Cincinnati; and Joe Sharp of Spencer Chemical Co., Kansas City.

Mr. Perrine recommended the semi-granular process in the case of a plant where management can't see sufficient potential to go 'all-out' for conversion to granular operation. He described typical equipment modifications, as cutting mixer flights down to 12" in 1-ton and 14" in 2-ton mixers, except at the discharge end. Nitrogen losses are generally higher in semi-granulating, he said, but product temperatures and moisture content are troublesome; also, use of sulfuric acid for heat is often 8 to 10 times as expensive as oil-fired heating. In semi-granulation, the operator should not be afraid of recycling, he warned, and sometimes may even find it necessary to shut down or re-run goods for cooling.

Mr. Schmalz talked about some typical semi-granular formulations of grades such as 4-10-7, 4-12-12, 10-10-10 and 8-16-16. He said Royster's experience had shown best results with coarse or granular potash. Single superphosphate covers and binds better than triple super, he stated, and 80 to 130 lbs. of sulfuric acid per ton of product seems to work best; less acid produces too many 'fines' and more acid results in excessive losses. Their operations use an exhaust hood and vent, he said, and a baffle-plate cascade or rehandling of the product after 12 to 48 hours for cooling, and no phosphate reversion has been experienced with this system even at pile temperatures.

Mr. Walton described their adoption of the Eyman process to produce 'grained' goods. Revised materials specifications meant a minimum equipment revision, he said, and the product—while having a wider size range than true granular—is dust-free, stores and drills well, and has no noticeable segregation in the pile. 80 to 90% of the product screens out to —4 +20 mesh, usually with all of it running +40 mesh; there is more —20 mesh product than in true granular goods, but less —60 mesh than in granulars.

The 'graining' process as they use it employs a 1½-ton batch mixer and two 6' x 20' coolers, he said, and the entire product originally went to storage, but the +4 mesh is now scalped off and recycled. While essentially inert, the recycle seems to promote graining.

Steam is retained in the mixer under pressure, Mr. Walton said, and fume and dust is lower than in conventional granulating. The

liquid phase of the product is contained in the surface, and they are currently obtaining 7½ units of ten nitrogen units from solutions, he said, but expect this to improve as they gain experience. They also use a modified diammonium phosphate material which seems to promote graining, especially in high-nitrogen grades, Mr. Walton concluded, and results appear better when the preponderance of all solid materials are in the granular or coarse range.

Mr. Sharp described the block sparger developed by his company, illustrating the device in detail with cutaway drawings and photographs on slide film. While the unit was actually designed for continuous operation, he said, there are several now in use on batch-type processes.

C. H. McCall of Booz-Allen Associates, Chicago, and Vance Ward of Canadian Industries Ltd., Montreal, teamed up to explain the theory and practice of Statistical Quality Control.

Mr. McCall covered the probability theory and statistical regularity, emphasizing attention to the number of units falling outside the upper control limits, and the range pattern within these control limits.

Mr. Ward, relating his material more specifically to application in the fertilizer industry, told how checkweighing—either continuously or random sampling—plays a big role in this control procedure. Done informally, however, it can result in an operator's 'hunting' and overcompensating on bagging machine adjustment. He outlined a practical system used by CIL in this field. He also outlined the pattern of frequency distribution in chemical analysis of goods, and suggested means of reducing the range of variations so that the lower limit of the distribution curve can remain within the lower limit of the control without heavy overformulation in materials.

The final session of the Round Table, devoted to Preneutralization, will be covered in the January issue of Commercial Fertilizer.

**Watch for
'Preneutralization'
from the
Round Table
in January's
Commercial Fertilizer**

500 ENTHUSIASTIC NSFA MEMBERS STUDY MANY NEW DEVELOPMENTS

A large and enthusiastic group of representatives from the liquid fertilizer industry turned out at St. Louis November 8-10 for the annual convention of the National Fertilizer Solutions Association.

Registration was just under the 500 mark, and scarcely a seat was vacant at the business session. A well-planned program covered the complete spectrum of materials, storage, formulation, sales, delivery and application.

Hugh S. Surles, Jr., of Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C. was elected president of the association, succeeding O. L. 'Bud' Ohnstad of Ohio Liquid Fertilizer Co., South Solon. Both have been very active in the solutions group since its initial year.

Dean R. McHard of Kaw Fertilizer Service, Lawrence, Kansas became the new vice president. Edward A. Wex of Badgerland Liquid Fertilizer Corp., Milwaukee, was elected treasurer, and Edwin Aylward of Aylco Fertilizer Division, Unexcelled Chemical Corp., Sullivan, Ill., was named secretary by the ballot. Muriel F. Collie of Chicago was again retained as executive secretary.

Sunday afternoon, initial day of the convention, was given over to a 'Solutions Equipment Style Show,' with Donald R. Humphrey of Flo-Lizer, Inc., Kingston, Ohio, presiding. Conference room exhibitors made brief appearances before the audience to tell what they had that was new or unusual, and to tell something about the nature of the exhibit set up in their own conference room.

That evening special buses carried

the conventioners down to the riverfront, where they were guests at a show aboard the last remaining Mississippi River showboat.

The opening business session on Monday morning, with Secretary Ed Wex at the gavel, got under way with the president's message from Mr. Ohnstad.

He remarked at the rapid growth of this section of the fertilizer industry, stating that the use of mixed liquid fertilizers was growing at a much more rapid rate than that of mixed fertilizers as a whole, and that the number of liquid fertilizer mixing plants has more than doubled in the past two years.

Describing an interesting new use for liquid fertilizers, Mr. Ohnstad told of the firefighting and fire-retarding value of ammonium phosphate solutions. He related how a demonstration in his own area had proved the value of a liquid 5-10-10 application in controlled burning of stubble in a field: the fertilizer was applied in a swath around the perimeter of the field as a barrier against spread of the fire from burning off the field; than, after burning, the scorched area was also fertilized with the material.

He outlined the expanded program of technical study that has been fostered by the association, and revealed that the 46 new memberships attained this year has brought membership to 208 firms, an increase of more than 300% in the past four years. A new slide film presentation, 'All the Same, Only Different,' plugging the use of liquid fertilizers and nitrogen solutions with 93 slides and a 17-minute commentary, was described by Mr.

Ohnstad, who told the group that copies would soon be available for distribution at a nominal cost.

In closing, he praised the services of Storms and Westcott, Chicago public relations firm which has handled the affairs of the association since shortly after its beginning, and especially commended Miss Muriel Colley of the firm, who acts as executive secretary for NFSA.

E. E. Crouse of C. D. Liquid Fertilizer Corp., Liberty, Ind., chairman of the nominating committee and one of the moving forces behind the association since its inception, presented his committee's new slate of officers and directors, which was accepted unanimously by the group.

New directors elected are: Edward O'Nan, Land-O-Nan Warehouse, Sturgis, Ky.; Edwin Aylward, new NFSA secretary; Rhoton Cross, Farmers Elevator Co., Oakville, Ind.; Clyde Gilna, Narco Chemical Corp., Denver; H. H. 'Bert' Tucker, Sohio Chemical Co., Lima, Ohio; Don West, Tryco Manufacturing Co., Decatur, Ill.; former Secretary John L. Wilson, Semo Liquid Fertilizer, Inc., Charleston, Mo.; and ex-officio Director O. L. Ohnstad, retiring president.

Holdover directors are: Nelson D. Abell, Ouachita Fertilizer & Chemical Co., Monroe, La.; August I. Balzer, Ok-Tex Chemical, Inc., Lubbock, Texas; H. R. Barry, Gates Rubber Co., Denver; Joe Gillespie, Standard Steel Manufacturing Co., Indianapolis; Donald Humphrey, Flo-Lizer, Inc., Kingston, Ohio; Hubert Johnston, Me-Jon Fertilizer, Oxford, Iowa; new Vice President Dean R. McHard; Carl Schumacher, Monsanto Chemical Co., St. Louis; and George H. Serviss, Coop. G.L.F. Soil Building Service, Ithaca, N. Y.

John L. Wilson, general convention chairman, was next, pointing out some of the remaining highlights of the program.

Then George J. Dole, supervisor of industrial technical service for Monsanto Chemical Company's Inorganic Chemicals Division, spoke on the subject Mr. Ohnstad had touched upon, Liquid Fertilizer as a Fire-Fighting Agent. The liquid formulation best-adapted to this application, he said, is the standard 8-24-0 ammonium phosphate solution.



New Fertilizer Solutions Officers

Left to right: Secretary Edwin C. Aylward, Aylco Fertilizer Division, Unexcelled Chemical Corp., Sullivan, Ill.; President Hugh S. Surles, Jr., Planters Cotton Oil & Fertilizer Co., Rocky Mount, N. C.; Vice President Dean R. McHard, Kaw Fertilizer Service, Lawrence, Kansas; and Treasurer Edward A. Wex, Badgerland Liquid Fertilizer Corp., Milwaukee, Wisc.

Addition of potash does not add to the effectiveness for this use, he mentioned, and addition of ammonium nitrate puts a combustible material in the solution, although in low concentrations this does not seem to affect the fire-retarding effect.

Actually, Mr. Dole said, a 15% solution of ammonium phosphate solids (equivalent of a 3-9-0 grade) has proved the best level; more concentrated solutions are satisfactory, but don't add to the effectiveness of the agent. Concentrations as low as five percent solid equivalent have been used successfully, he revealed, but the 15% level has proved superior from all standpoints. A simple method of converting the standard 8-24-0 to 15% concentration is to add 2.4 gallons of water per gallon of 8-24-0 solution.

Since 1930 the value of ammonium phosphate solution has been well established, as has the value of phosphoric acid, for fire-fighting, Mr. Dole stated, but handling problems of the latter have discouraged its use. Borate slurry has been used very successfully in California, but only as an air-drop material, since it is hard to pump and can't be sprayed; California still uses a borate slurry—or bentonite slurry, just for thickening.

Ammonium phosphate solutions have been accepted by Georgia and Missouri as air-drop and ground-spray fire fighters, he stated, and North Carolina is in the final stages of testing the material. Approval chances look good in Florida, and Mississippi is currently having demonstrations. Advantages of the ammonium phosphate solution are numerous, according to Mr. Dole; it is water-thin, easy to pump and spray, and versatile. The low concentration—1½ pounds per gallon as compared with 4 pounds per gallon for other materials—aids in saving 50 to 75% in cost for the forest service. Also, it can be stored almost anywhere except in aluminum containers.

Methods of use are numerous, Mr. Dole related; it can be sprayed directly on the fire, or ahead of it in a line. It can also be used to insulate fire breaks, or to replace fire breaks in starting of back-fires. In mopping-up, only one-fourth as much ammonium phosphate solution is required as water for the same effect. An additional use, he explained, is in selective burning under controlled conditions, by ringing an area with a 6 to 8 foot wide swath and setting a fire in the center in

preparation for plowing—or the farmer may be sold on stocking some of the material for emergency use on straw fires.

Final speaker on the morning program was Vern R. Martin, sales consultant and retired general sales manager for Maytag washers. He painted a picture of a planned selling program to eliminate the 'sales barnacles' that slow down the motion of a company. No matter how good a product is, he emphasized, it takes well-trained and well-motivated men to sell it.

Monday afternoon and evening was devoted to visitation in the suppliers' conference rooms, which occupied nearly two complete floors at the hotel.

The Tuesday forenoon session, with Vice President Hugh Surles presiding, heard a series of talks on new developments in processing liquid fertilizers and reports on the primary nutrient materials situations.

William S. Newsom, Jr., of International Minerals and Chemical

Corporation's research engineering and development division, led off with a description of some of the research and results that have been connected with suspension fertilizers.

Mr. Newsom stated that high cost of raw materials for liquid fertilizers caused manufacturers to look for ways of reducing this cost. Substitution of wet process acid for electric furnace phosphoric acid offered one solution to the problem, but presented a new problem in dispersing settled impurities during storage.

Research determined that a small amount of an inexpensive agent such as colloidal clay would prevent or delay settling to the extent that slight agitation would make the mixture homogenous. These fluid fertilizers still contain crystals of materials suspended in the settled solution, but the impurities remained in such small crystals that they could be mixed, pumped and applied to the soil with no great alteration in manufacturing or application equipment.

Supplemental nitrogen is supplied from neutral ammonium nitrate-urea-water solutions in most grades and/or economical ammonia-urea-water solutions, and in some grades ammonia-ammonium nitrate - water solutions can be used.

A fertilizer plant can produce about 33% more in terms of nutrients by producing suspensions instead of liquids, Mr. Newsom pointed out. This is especially important in the spring season when demand exceeds plant capacity. In addition, he stated that it put fluid fertilizers on a basis to compete with solid fertilizers on a concentration basis, effectively increasing the economical market area of the plant; the value of this is apparent when one realizes that extending the distribution radius from 35 miles to 50 miles actually doubles the area which the plant can serve.

Secondary and minor elements can also be incorporated in significant quantities in the suspension fertilizers, even though they may precipitate in the presence of phosphates. In addition, economical chloride-free fertilizers can be produced by using potassium sulphate as the K_2O source.

Pointing out some of the disadvantages of suspension fertilizers as compared with liquids, Mr. Newsom stressed that more skill is required on the part of operators, some additional capital expenditure is required, the plant is more difficult to



In the Limelight

W. Harold Schelm (left), Schelm Brothers, Inc., East Peoria, Ill., receives NFSA 'Man of the Year' award from Bill Parrish, Parrish Soil Builders, Auburn, Ill.; seated at right is NFSA President O. L. Ohnstad, Ohio Liquid Fertilizer Co., S. Solon.
NFSA President O. L. 'Bud' Ohnstad; Executive Secretary Muriel F. Collier, Chicago; and General Convention Chairman John L. Wilson, Semo Liquid Fertilizers, Charleston, Mo.

keep clean, and sometimes there may be customer resistance to the new product.

In discussing suitable raw materials for suspensions he pointed out that wet process phosphoric acid is preferable to electric furnace acid because of the suspending properties developed in the mixture by precipitated iron and aluminum phosphate.

Muriate of potash can be added with the flotation (red) or recrystallized (white) material; anhydrous aqueous ammonia can be used; if aqueous ammonia is used, a 50% concentration is preferable. Ammonium nitrate-urea-water solutions (32% N solution is preferable if temperature permits), ammonia-urea-water solutions or ammonia-ammonium nitrate-water solutions are all satisfactory.

As for the suspending agent, Mr. Newsom said that attapulgite clay or Western bentonite is recommend-

ed; non-swelling Southern bentonite is not recommended. Either potassium sulphate or sulphate of potash-magnesia may be used as a source of K_2O .

Mr. Newsom expressed a preference for separate clay dispersion equipment; mixing tank, high shear apparatus (such as gear-shear pump or Cowles dissolver, or high speed stone mill—each having advantages and disadvantages for the application), and storage tank (if a pump is used, clay may be added to water in the storage tank, eliminating need for mixing tank). For large-scale suspension of fertilizer manufacturing operation he recommended the consideration of clay dispersion equipment such as a gravimetric feeder for bulk dry clay, a jet mixer, scales, a clay slurry meter with positive displacement pump, water meter and ammonia meter.

The mixer should have at least a 3 or 5 horsepower motor with a gear

reducer and two propellers on the shaft, Mr. Newsom felt, and should be mounted off-center. The neutralizing tank depth should be as great as or greater than the diameter, and the bottom should be conical; if ammonia and acid cannot be metered in simultaneously the tank should be made of 316 stainless steel; if exterior cooling is not practical the tank should be jacketed and cold water passed through the jacket. Cooling coils in the tank are not recommended, he stated.

Even with the tank mounted on scales, Mr. Newsom recommended use of an ammonia meter, or weighing of the ammonia before introducing it. He stated that a 24 to 28 (Tyler) mesh stainless steel screen is recommended under the neutralizing tank to remove trash; if the product is to be stored the same size screen should be used between the storage tank and loading point, and the next larger size should be used in the application equipment.

He discussed technique and mixing order where the acid must be added before the ammonia, and said that one need not be concerned if the mixture tends to thicken too much during mixing, as agitation and addition of ammonia will thin it down. He discussed technique and mixing order when ammonia and acid are added simultaneously, and thoroughly covered the clay dispersion technique, describing the properties of various equipment used in this operation.

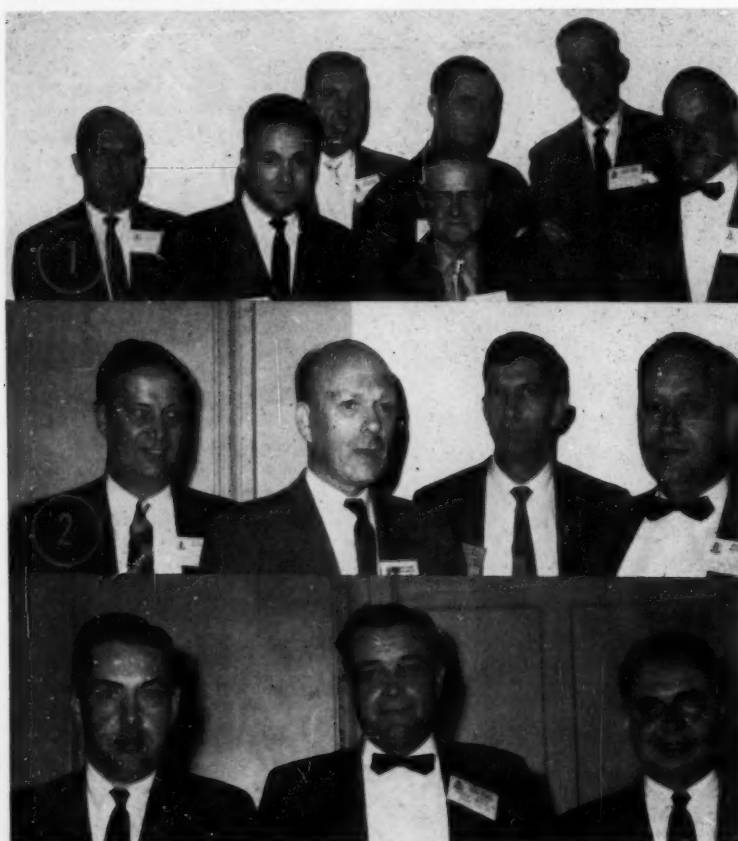
The percentage of clay necessary in a suspension depends on the clay, the formula, method of neutralization, temperature and length of storage. In general, he stated that 20 pounds of clay per ton on a dry basis is adequate when mixtures are stored less than a week—but said that they had used as much as 50 pounds per ton without causing viscosity to become too high.

In attapulgite slurries he stated a preference for 13 parts of clay to 87 parts of water, which is thin enough to be handled without overloading equipment; in bentonite slurries he recommended 8 parts bentonite to 92 parts of water. Mr. Newsom discussed methods of reducing viscosity-clay-water suspensions so that less power is required for dispersion.

Grades successfully prepared in the lab or pilot plant included: 12-12-12, 16-8-8, 5-15-15, 2-6-18, 8-16-16, and 14-9-7; these grades derived K_2O from muriate of potash. Chloride-free grades from sulphate of potash included 4-8-12 and 5-10-15.

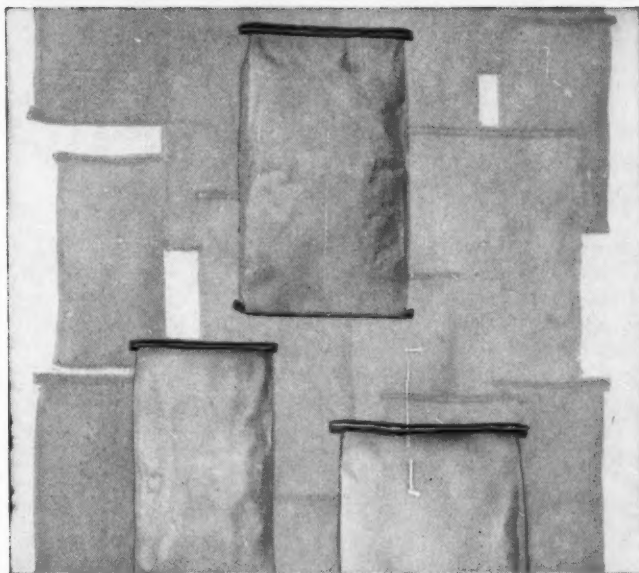
Among Speakers at Liquid Meeting

1. "What's Bothering You" panel group—Front row: Eddie Crouse, C. D. Liquid Fertilizer Corp., Liberty, Ind.; Moderator Bob Lemler, Aylco Fertilizer Div., Sullivan, Ill.; L. T. Stone, Goodpasture Grain & Milling Co., Brownfield, Texas; and Edward A. Wex, Badgerland Liquid Fertilizer Corp., Milwaukee. Back row: Carl Johnson, Cropmaker Soil Service, Walton, Ind.; Ed. Aylward, Aylco Fertilizer Div., Sullivan, Ill.; and Morris Woosley, West Kentucky Liquid Fertilizer Co., Hopkinsville.
2. Bert Tucker, Sohio Chemical Co., Lima, O.; Forrest Batson, General Chemical Division of Allied Chemical Corp., New York; Bill Newsom, International Minerals & Chemical Corp., Mulberry, Fla.; and Edgar Sawyer, Minerals & Chemicals Corp. of America, Menlo Park, N. J.
3. Jim Brown, Inorganic Chemicals Div., Monsanto Chemical Co., St. Louis; Joe Tuning, Spencer Chemical Co., Kansas City; and Ed Kapusta, U. S. Borax & Chemical Corp., New York.



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Chloride-free 4-8-12 was prepared with mixtures of sulphate of potash and sulphate of potash magnesia. A no-phosphate chloride-free grade with 5% water soluble MgO made from sulphate of potash magnesia was 10-0-6-5.

In general, Mr. Newsom said the total plant nutrient content appeared to reach an upper limit at about 40%, except in the case of 1:3:0 ratios. The sum of the nitrogen and potash should not exceed 24%, he felt. These limits can be raised somewhat by using urea as the only source of supplemental nitrogen, or using caustic potash as the source of K_2O , Mr. Newsom said, but to do so would nullify the advantage of the lower cost wet process acid. However, he felt that future research would undoubtedly raise these limits.

The advantages of suspension fertilizers appear to be so great that serious consideration of trial production during the off-season is highly recommended, Mr. Newsom concluded.

E. W. Sawyer, of the Research Department of Minerals and Chemicals Corporation of America, spoke also on the same topic, confining his remarks to stabilization of suspension fertilizer with colloidal attapulgite. He illustrated his talk with slide films showing the pilot plant operation used by his firm, which actually simulated a small operational plant. His slides included photographs of formulations following storage, illustrating the difference when suspending agents were used. Mr. Sawyer presented a diagram of a simplified clay dispersing unit used by his company for experimental work, and actually gave formulation data on some of the grades which they had produced, many of which contained minor elements and other insoluble ingredients.

Forrest M. Batson, assistant manager of Technical Service for the General Chemical Division of Allied Chemical Corporation, spoke on use of green phosphoric acid. He described much of the work that has been done in removing large quantities of the impurities from wet process acid, and offered photos and diagrams of a phosphoric storage unit which would enable many fertilizer mixers to store on the premises at a low cost a sufficient quantity of acid to keep their production moving despite irregular shipments through the rush season.

The storage unit described by Mr. Batson was a swimming pool type

facility scooped out of the earth by a bulldozer, using the excess dirt to build the walls higher than the surface of the ground. The pool was lined with wire screen (to keep bugs from burrowing through), and layers of burlap and asphalt. It was covered with an A-type wooden roof.

This type of storage for acid can provide capacity for an additional 400 tons at a cost of somewhere between \$3,000 and \$5,000, he stated.

H. H. "Burt" Tucker, director of Agricultural and Technical Service for Sohio Chemical Company, spoke on nitrogen formulas in liquid fertilizers. Formulating liquid fertilizers is in some ways less complicated, but in other ways more complicated, he said, than formulating dry fertilizers. Formulations are less complicated in that with liquids the chemical reactions are instantaneous and complete; they are more complicated in that they must be formulated to a more exact pH to control solubility of phosphates. Also they must be more exact in the amounts of urea and/or ammonium nitrate used, as this relationship also affects solubility. Because of this, formulations are seldom simple calculations; nitrogen formulations for liquid fertilizers are generally more difficult than for other plant foods because 2 or 3 sources of nitrogen are used while normally only a single source of material supplies potash and a single source supplies phosphate.

Mr. Tucker took a specific ammoniation rate of 8.1 pounds of ammonia per unit of P_2O_5 and carried through a complete analysis of various formulations at this level. He discussed some new triangular formulation charts developed by his company to help simplify the calculation of liquid fertilizer formulations, illustrating these with slide films showing salt-out characteristics of some materials and graphs showing the desirable range of combination materials to be used in adding nitrogen to liquid grades.

He pointed out that urea offers higher solubility and lower salt-out temperatures, but a higher ammonium nitrate/urea ratio offers lower cost.

J. E. Tuning, marketing manager for direct application materials for Spencer Chemical Company, spoke on the nitrogen situation. He pointed out that each year since 1953 there has been some unused nitrogen capacity, and that last year sales for all products used only 82% of the available capacity.

Temporary shortages were due to a number of reasons, Mr. Tuning said: nature of the market; inaccurate reporting of tonnage figures to state and federal agencies; incorrect market forecasting; unfavorable weather conditions early in the spring season; light fall movement resulting in production curtailment during the off-season; an increase in

KEY TO STAFF PICTURES

1. Fred Ledlow and Tom Henry, Rainbow Chemicals Ltd., Tilbury, Ont., Canada; and Joe Stough, U.S. Borax & Chemical, Columbus, Ohio.
2. Joe Eckert, Ford Motor Co., Dearborn; Bert Tucker, Sohio Chemical Co., Lima; and Clarence Gutwein, Gutwein Agricultural Service, Francesville, Ind.
3. R. L. "Chris" Chrisinger, Soil Service, Winfield, Iowa; Fred Battles, L. L. Carpenter and Jack Bailey, all with Carpenter Supply Co., Bondurant, Iowa.
4. L. B. Wilkins, Tidewater Chemical Co., St. Brides, Va.; George Culver, Huston Culver Fertilizers, Seaford, Del.
5. Richard M. Edwards, Hercules Powder Co., Louisiana, Mo.; A. J. Yates, Britz Fertilizer Co., Five Points, Calif.
6. G. C. Matthiesen, Allied Chemical, New York; Ike Swisher, Allied Chemical, Indianapolis; Joe Hamilton, Dave Edwards, R. W. Edwards and Joe Schmitt, all with Monco Liquid Fertilizer Co., Monmouth, Ill.
7. Mr. & Mrs. Jim Merriman, Merriman Truck Service, Monticello, Ill.
8. Rhoton Cross and Lincoln Bowers, Farmers Elevator Co., Oakville, Ind.; and M. F. Gribbins, DuPont, Wilmington.
9. Bob Roelke, General Chemical Div., Allied Chemical Corp., St. Louis; Eldon Freeman of Mexico, Mo. and Lewis DeHart of Plattsburg, Mo., both with Sur-Gro Plant Food Co.; and Jack Owen, Allied Chemical, St. Louis.
10. John Mahan, USDA, Washington and Paul Regan, American Cyanamid Co., New York City.
11. Art Jetter, Farm Fertilizers, Omaha; W. P. Dean, Swift & Co., Chicago.
12. Don Flory, Allied Chemical, Holdrege, Nebr.; Maurice Miller, Holdrege Seed & Farm Supply, Holdrege; and James Williams, B. I. Whitlock Co., Stafford, Kans.
13. Chick Meade, Me-Jon Fertilizer Co., Oxford, Iowa and Thomas Cochran, Crookston Liquid Fertilizer Co., Crookston, Minn.
14. John Mona, Allied Chemical, New York; Glen Hogue, Allied Chemical, Waterloo; R. L. "Chris" Chrisinger, Soil Service, Winfield, Iowa.
15. Mr. & Mrs. J. H. Delaney, Farm Crop Feds, Hoffman, Ill., and Howard Gaskins, Illinois Farm Supply, Chicago.
16. Bryce Strachan, Southern Liquid Fertilizer Co., Boynton Beach, Fla.; and Virgil Puckett, W. Kentucky Liquid Fertilizer Co., Hopkinsville.
17. Bill Mierke, Tennessee Corp., Crestwood, Mo.; Jack Davis and Felix Davis, both with Commonwealth Fertilizer Co., Russellville, Ky.
18. Harvey F. Zahn of New York and Bob Purcell of Chicago, both with Westvaco Chemical, and Bill Lohry, Nutra-Flo Fertilizer Co., Sioux City, Iowa.
19. Max Moore, Moore Farm Service, Bement, Ill.; Chuck Trunkey, U. S. Industrial Chemical Co., Chicago; and Howard Moore, Moore Farm Service, Bement.
20. Morris Woosley, W. Kentucky Liquid Fertilizer Co., Hopkinsville, and Norman Dean Godden, Flo-Lizer, Inc., Kingston, Ohio.
21. Eldon Freeman, Sur-Gro Plant Food Co., Plattsburg, Mo.; Dudley Cason, American Cyanamid Co., Marshall, Mo.; V. C. Jelley, American Cyanamid Co., Kansas City; and George Summers, American Cyanamid Co., Stillwater, Okla.
22. Bell Sime of Madison, Wisc., and Larry Lortscher of Columbus, Ohio, both with Spencer Chemical Co.
23. Eugene Reichard and Clarence Reichard, both with Robert A. Reichard Co., Allentown, Pa.; and Tom Morrison, Philipp Bros., New York City.
24. Harold Hein, International Harvester Co., Hinsdale, Ill.; William Anderson and Harry Rohlf, R 'n' S Corp., Akron, Mich.
25. A. J. Buscher and Charles Jacques, Jacques Seed Co., Prescott, Wisc.
26. Peter Griffin, Nitrogen Div., Allied Chemical, Westerville, Ohio; Leo Fisher, Ohio Liquid Fertilizer Co., S. Solon; and Henry D. Troyer, Green Dew Farm Chemicals, Plain City, Ohio.

CF
Staff
Pictures
from
NFSA
Meeting



farm income during 1958; removal of corn acreage controls resulting in a 15% increase in corn acreage; limited product storage; improved application equipment; increased sales effort; and highly satisfactory crop responses.

As for the picture for the present year he indicated that a favorable year is expected tonnage-wise with another jump in consumption very likely. Additional storage being provided at plant sites, terminal points and useage points should help avoid the bottleneck, he stated, and additional loading facilities will also contribute to this.

The nitrogen distributor or mixer can help assure better service also, he stated, by making full use of available storage, by starting spring operations as soon as soil and weather conditions permit, by pushing extra hard on off-season and pre-planting application, and by unloading tank cars fast so they can be returned immediately to the supplier.

He illustrated the problem of the nitrogen producers graphically by use of a series of containers, each representing one month's nitrogen capacity. He showed how these can fill to overflowing all available storage before the peak demand season, causing a cut-back in production, and thus a shortage of the material when the spring season arrives.

James L. Brown, supervisor of phosphoric acid sales for Monsanto Chemical Company's Inorganic Chemicals Division, talked about the phosphates situation for the current fertilizer year. He explained how phosphoric acid producers had had difficulty in anticipating the volume required for liquid fertilizers, stating that liquid fertilizer tonnage had risen from 100,000 tons in 1955 to 475,000 tons this year. Part of the lack of capacity to meet this demand was because of a delay in compilation of annual figures; part was due to a tonnage decrease in 1956 for all fertilizers, and the 1957-58 recession which prevented materials producers from considering plant expansions. After all this was settled, there was a lag due to the time involved in planning, designing, locating and constructing additional facilities.

All larger producers and many minor producers have expanded their phosphoric capacity, Mr. Brown pointed out, and the industry's capacity—exclusive of Tennessee Valley Authority production—has increased from 265,000 tons in

1955 to 350,000 tons in 1959. He estimated 1960 capacity at 387,000 tons and 1961 capacity at 420,000 tons.

Mr. Brown summarized what the fertilizer manufacturer can do to help avoid shortages at his own plant: consult with your supplier, estimate your needs carefully, and add to your storage capacity.

Final speaker on the morning program was Edwin C. Kapusta, technical services director for United States Borax and Chemical Corporation, who summarized the potash situation for the current fertilizer year. Potash capacity in the U. S. has in recent years been greater than the demand, he pointed out, but there was the difficulty of anticipating the market. Potash consumers, however, have experienced little if any difficulty in obtaining deliveries of the type of products they wanted, when and where they wanted them, he emphasized.

Citing statistics from the Bureau of Mines and from American Potash Institute, he predicted that there would be little increase in North American potash capacity this year which could materially affect the quantity of potash available.

Nevertheless Dr. Kapusta stressed the fact that imports and exports are less easily defined than domestic production and consumption, and pointed that they could change the potential supply of the material for domestic use.

It is believed that overall inventories on hand at the beginning of this fertilizer year were lower than those on hand a year ago; with the prospect of a substantial increase in exports and only a slight increase in imports, it would appear that potash supply and demand may be in closer balance than in recent years.

Since higher-purity agricultural grade muriate of potash is used in liquid fertilizer manufacture, it is conceivable that the market situation would leave the supply of this material in greater doubt, Dr. Kapusta stated, than that of the lower-analysis agricultural muriates — as the higher purity material has a wider variety of end uses.

His suggestion to the fertilizer mixer was to properly plan and schedule the ordering of his raw materials in advance of his needs, making allowances for in-transit time from the source to his plant. Consideration should be given to the construction of additional storage facilities where existing facilities are not adequate to meet fluctuations in the manufacturing program.

The afternoon session was given over to a "Town Hall" meeting, with Treasurer and General Convention Chairman John L. Wilson presiding. A panel of prominent liquid fertilizer manufacturers from all sections of the country, moderated by Robert A. Lemler, of Aylco Fertilizer Division, Sullivan, Illinois, tackled the topic "What Is Bothering You?"

On the panel were Nelson D. Abell, of Ouachita Fertilizer and Chemical at Monroe, La.; Edwin C. Aylward, Aylco Fertilizer Division, Sullivan, Ill.; E. E. Crouse, C.D. Liquid Fertilizer Corp., Liberty Ind.; L. T. Stone, Goodpasture Grain and Milling Co., Brownfield, Texas; Edward A. Wex, Badgerland Liquid Fertilizer Corp., Wilwaukee; Morris Woosley, West Kentucky Liquid Fertilizer Corp., Milwaukee; Morris Johnson, Cropmaker Soil Service, Walton, Ind.

Each of the panelists began by outlining one specific subject, then the floor was opened to questions and an active session followed, with excellent participation from the audience.

Among the topics covered by the panel were selling; advertising; materials storage and formulation; farmer and dealer meetings; use of super phosphoric acid; application equipment; use of meters on trucks; and the advantages and disadvantages of farmer-owned application equipment vs. ownership of equipment by the liquid fertilizer manufacturer.

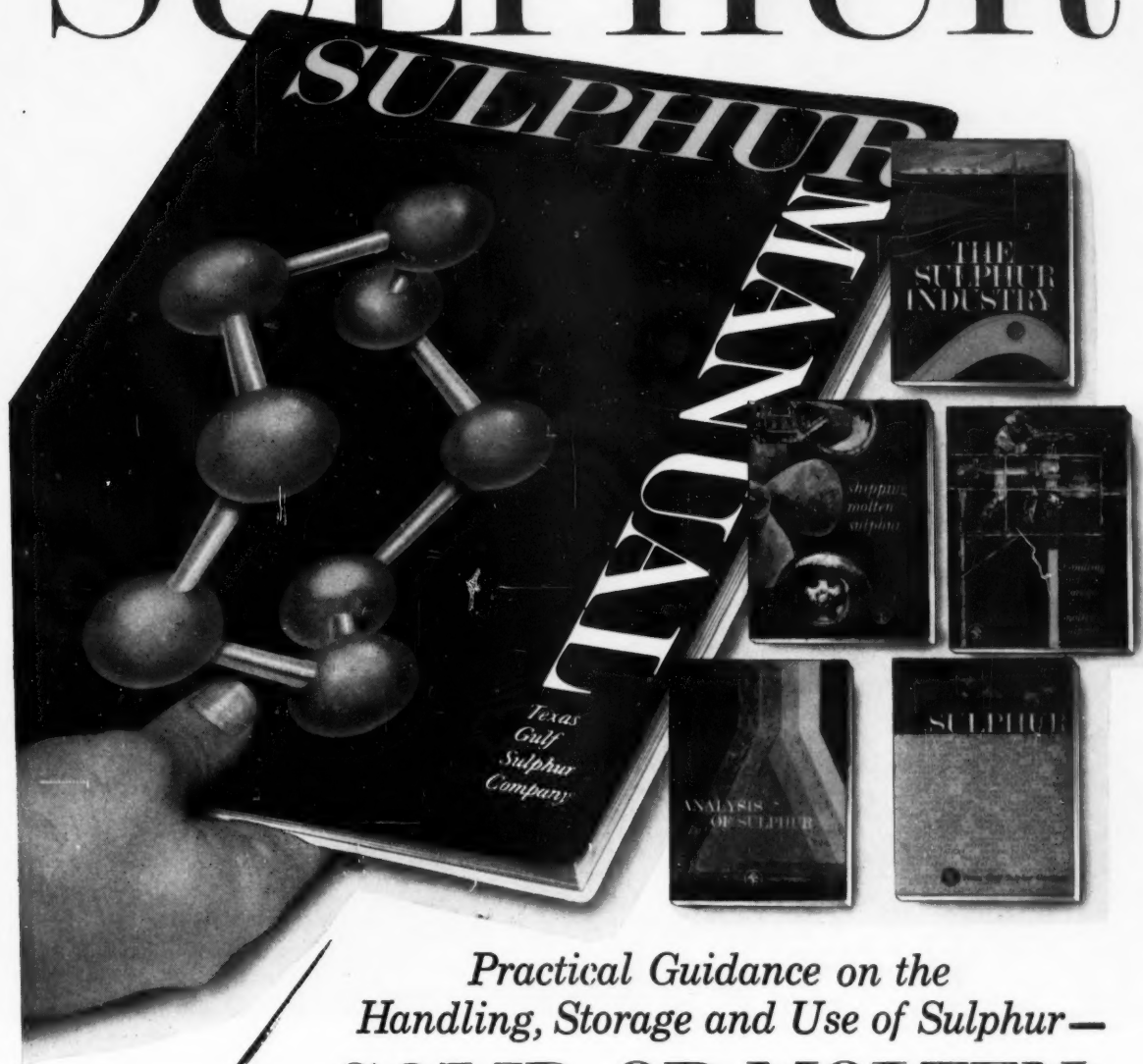
At the annual dinner that evening, President O. L. Ohnstad presided. Director William B. Parrish, of Parrish Soil Builders, Auburn, Ill., made presentation of the "Man of the Year" award. This award, in recognition of outstanding work done by a member in the interest of the association of the industry, was presented to W. Harold Schelm, president of Schelm Bros., Inc., manufacturers of liquid fertilizer equipment at East Peoria, Ill.

This is the second of these annual awards: presentation of the initial award at last year's meeting was made to Walter Colvin, director of Agricultural Sales for the Nitrogen Division of Allied Chemical Corporation.

The new officers were introduced at the banquet and the audience thoroughly enjoyed a talk by a humorous speaker.

Announcement was made of the plans for the 1960 convention to be held at the Peabody Hotel in Memphis, Tenn., November 9-11.

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Answering the demand of its customers for direct sales assistance, IMC has just concluded a series of two-day meetings aimed at making sales calls more effective for the fertilizer industry. Five hundred and sixty-four industry representatives — salesmen, sales managers, general managers and presidents — attended IMC-sponsored sessions in ten key cities around the country. Almost every conceivable visual aid was employed to dramatically convey practical ways of stretching selling time — exploiting buying motives — appraising the market

— searching out potential customers — credit handling and closing the sale. Typical comments received at conclusion of the meetings were —

"If we apply what we heard, this year's sales will set new records."

"This was an invaluable meeting; we needed this kind of help badly."

"Without doubt, this was the most stimulating meeting I ever attended."

"Ideas of this kind will put new life in our industry."

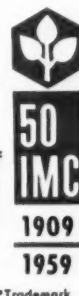
IMC is eager to help you realize the full sales potential of your marketing area. Your IMC representative is trained and equipped to help you with your *total* selling problem. His is a mission of *total service* to his customers. Just give him a call!

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AGRICULTURAL CHEMICALS DIVISION
INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Administrative Center: Skokie, Illinois

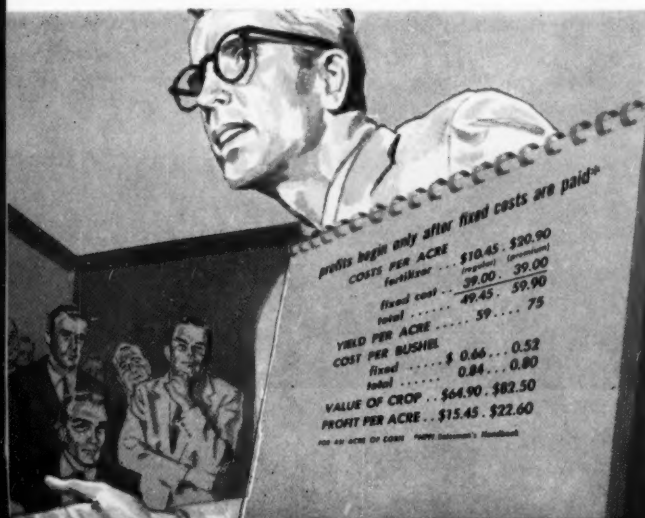
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*Trademark

Sales logic is explored and ways to use it most effectively explained.

Careful analysis of the customer enables sales story to be fitted to his particular interests.



1

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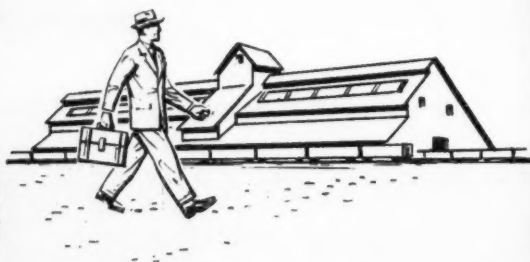
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How Agriculture Makes Progress

Farmers Rely On Our Industry

"The California farmer relies heavily on the advice and assistance of well-established fertilizer concerns to help determine his fertilizer needs and methods of usage, according to a study just published by the University of California."

This was a statement made today by Dr. Richard B. Bahme, Western Regional Director of the National Plant Food Institute, which sponsored the study.

"Farmers interviewed indicated that fertilizer company representatives were their main source of information in determining their fertilizer practices," Dr. Bahme said. "Almost three-fifths, or 60 per cent, of the farmers listed fertilizer fieldmen as their primary source of information. Farm advisors were the sources for two-fifths of the farmers." The report covers a survey of farmers and a total of 81 agency representatives serving farmers in two California counties. Object of the study was to determine who helps the farmer most in his use of fertilizers.

"According to fertilizer company representatives interviewed," Dr. Bahme continued, "almost all (90 per cent) of the farmers purchasing fertilizers ask for information on kind and amount to use, proper placement, and proper time of application. These company representatives further reported that three-fifths of the farmers follow the recommendations they give them."

Soil Campaign Aids Alabama Farmers

"Average yields are not good enough for Alabama farmers," says J. C. Lowery, Auburn Extension Agronomist.

"Efficient crop production methods are necessary in today's agriculture for high yields and more profits per acre. High soil fertility is the most important of the many crop production factors that contribute to a profitable farm program."

Soil testing is the best guide to a proper soil fertility program and since it is a relatively new practice for Alabama farmers, the Agricultural Extension Service of Auburn University under the leadership of Mr. Lowery launched an Intensified Soil Fertility Campaign in 1959.

The campaign depended to a great deal upon the publicity and promotional efforts of a large number of persons. Assisting in this effort were the Alabama Soil Fertility Society, American Potash Institute and the National Plant Food Institute.

Twelve additional counties will join the Alabama Soil Fertility Campaign in 1960. Lauderdale and Limestone counties have already "kicked-off" their soil testing promotional efforts, reports Dr. S. L. Tisdale, Southeastern Regional Director of the National Plant Food Institute.

Illinois Schools in Oct.-Nov.

Eight seed and fertilizer clinics attracted 460 Illinois dealers and sales representatives during October and early November. Sponsored jointly by the Illinois Agricultural Extension service, the Illinois Seed Dealers Association, the National Plant Food Institute, and the Illinois Fertilizer Industry Association, the meetings provided an excellent example of effective cooperation between educational and trade groups.

Arkansas—Nov. 3-4

The Texas Agricultural Extension Service completed the first phase of its new Intensified Soil Fertility Program with a county agent training session at College Station, November 3 and 4. Industry agronomists were invited to attend the training meeting for agents from the 13 counties selected for participation in the statewide pilot project.

Ohio—Nov. 17

Prominent scientists were featured on the Division IV-B program on the theme of "Research in Action—The Short Circuit Process" on No-

vember 17, the American Society of Agronomy meeting, with Dr. William D. Bishop as Chairman.

Speakers and their subjects were:

Dr. R. E. Blazer, Professor of Agronomy, In Charge of Forage Crop Research, Virginia Polytechnic Institute on "A Problem Oriented Research Program with Alfalfa"; Dr. J. Fielding Reed, Southern Director American Potash Institute, Atlanta, on "Diagnostic Techniques Put Research Findings into Action"; James R. Turner, Agronomist, U.S. Borax and Chemical Corp., and Joseph D. Burns, Extension Agronomist, University of Tennessee on "Field Demonstrations Show on the Farm Proof of Research Findings"; Dr. George D. Scarseth, Director of Research, American Farm Research Association, on "The Role of Industrial Agronomists in Agriculture"; and Dr. E. T. York, Jr., Director, Agricultural Extension Service, Alabama Polytechnic Institute, on "Summary Contributions and Opportunities for College and Industry."

Colorado—Nov. 17-20

A series of three Fertilizer Sales Schools for Fertilizer Distributors, Dealers and Salesmen in Colorado got underway November 17.

Sponsored by the Rocky Mountain Plant Food Association with the cooperation and participation of National Plant Food Institute Western Regional Director Dr. Richard B. Bahme, these meetings were held at Greeley November 17, at Pueblo November 18, and at Grand Junction November 20.

Delaware—Nov. 23-24

"Crop Improvement Through Better Fertilization" was the theme of this year's crops and soils program at Dover, Delaware, November 23-24, under the sponsorship of the Delaware Crop Improvement Association.

A Farm-City Week banquet was held the evening of Nov. 23 and a short course on fertilizer Nov. 24, with an awards banquet that evening. The State Crops Show was held both days at the Capital Grange Hall.

Fertilizer specialists from Tennessee, North Carolina, Virginia, Maryland, Delaware, and Washington, D. C. participated in the short course. The program emphasized the importance of fertilization and other sound fertility practices. Louis H. Wilson, secretary and director of information for the Institute was the banquet speaker.

Speaking on the effect of fertilizer on Delaware's economy at the Farm-

City Week banquet was Francis A. Raymaley, American Cyanamid Co.

Indiana—Dec. 2

"What a Farmer expects From His Fertilizer Dealer" will be the subject of a panel discussion at the forthcoming Indiana Fertilizer Conference, December 2, at Purdue University, Lafayette.

Missouri—Dec. 2-3

The annual Soil Fertility and Plant Nutrition Short Course to be held in Columbia on December 2 and 3, will be dedicated to Dr. Albrecht this year. Plans are complete for the recognition of Dr. Albrecht's long service and wide interest in the implications of soil science.

Many of Dr. Albrecht's former students and friends have suggested a soil science lecture fund in his honor. It is hoped that contributions will be sufficient so that the income derived will permit outstanding speakers to be brought to this campus each year. You are invited to contribute. The symposium to be held on December 3, can be regarded as the first of the type of program the committee has in mind. It is planned to publish the symposium papers as a recognition volume.

At the recognition dinner, they plan to present to Dr. Albrecht a book of congratulatory letters from his friends.

Minnesota—Dec. 7-8

The annual Soil and Fertilizer short course will be held at the University of Minnesota's St. Paul campus Dec. 7 and 8, according to J. O. Christianson, agricultural short course director.

The first day will be an open session and the second will be a special session for the fertilizer industry.

Kansas Schools—Dec. 9, 10, 11

Three district Fertilizer Dealer-County Agent Training Schools are slated for Kansas the second week in December.

All fertilizer companies doing business in Kansas are urged to get their salesmen and dealers to attend.

Dates and locations of the schools are: Dec. 9, Chanute; Dec. 10, El Dorado; Dec. 11, Wichita. Sessions will start at 1:00 p.m. and continue through evening dinner.

Iowa—Dec. 10

Sales tools that can help National Plant Food Institute member company salesmen and dealers increase the use of fertilizer, will be presented at the Institute-sponsored Iowa

GRANTS

\$8,250

American Potash Institute has granted \$8250 to the N. C. State soils department for a study on the role of potassium in helping plants utilize carbon from the carbon dioxide in the air.

\$8,600

National Science Foundation has granted \$8,600 to the University of Florida College of Agriculture to set up a project on tree growth. Dr. Carl D. Monk who has done previous research on the subject will conduct a three year study on the effect of temperature, moisture, humidity, length of day and environmental factors on tree growth.

\$2,500

Research work to determine the factors limiting the production of corn, cotton, and soybeans is continuing at the Edisto Branch Station of the South Carolina Agricultural Experiment Station it was announced by G. H. Collings, Head of the Department of Agronomy at Clemson College. This work, which was begun in 1958, is being supported in part by a grant of \$2,500 from the National Plant Food Institute.

It is expected that the study will continue for a number of years and that the NPFI will continue to lend limited support to this undertaking.

Fertilizer Promotion Workshop on Dec. 10, at the Savery Hotel, Des Moines.

Arkansas—Dec. 10-11

The ninth annual Arkansas Plant Food Conference will be conducted in the Lafayette Hotel in Little Rock, Dec. 10-11. The conference is being sponsored by the Arkansas Agri-

cultural Experiment Station, the Arkansas Plant Food Education Society and the Agricultural Extension Service.

New Mexico—Jan. 13

The third annual Agricultural Chemical Conference will be held January 13, at New Mexico State University, Dr. J. Gordon Watts, head of the department of botany and entomology, announced.

Results of research on insecticides, nematocides, fungicides, herbicides, and fertilizers will be the general subjects of the conference.

Arizona—Jan. 20-21

Wednesday and Thursday, January 20 and 21, 1960—Third Annual Arizona Fertilizer Conference, University of Arizona Campus, Tucson, Arizona. Presented by the University of Arizona with cooperation of Soil Improvement Committee, Arizona Agricultural Chemicals Association, and the National Plant Food Institute.

Louisiana—April 6-7

Louisiana State University's ninth annual Forestry Symposium will be held April 6 and 7, 1960.

Topic for the two-day meeting is "The Use of Chemicals in Southern Forests." The discussion will include chemical usage in forest protection as well as fertilization and herbicides.

Inquiries should be addressed to Professor Robert W. McDermid, general chairman, LSU School of Forestry, Baton Rouge 3, La.

Arizona Banks Publish Farm Booklet

A 20 page booklet in color has been published by the Arizona Bankers Association for distribution to farmers. The theme: "In Arizona, fertilizer, irrigation and sunshine work as a team."

Industry Meeting Calendar

DATE	EVENT	LOCATION	CITY
1960			
Jan. 13-15	Agricultural Ammonia Institute	Statler Hilton Hotel	Dallas, Texas
Feb. 11-12	Midwest Industry-Agronomist Meet	Edgewater Beach Hotel	Chicago, Ill.
June 12-15	National Plant Food Institute	Greenbrier Hotel	White Sul. Spgs., W. Va.
July 27-30	Southwest Fertilizer Conference	Galvez Hotel	Galveston, Texas
Oct. 17-18	Fertilizer Safety Section	LaSalle Hotel	Chicago, Ill.
Nov. 2-4	Fertilizer 'Round Table'	Mayflower Hotel	Washington, D. C.
Nov. 9-11	National Fertilizer Solutions Assn.	Peabody Hotel	Memphis, Tenn.

CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	October		September		July-Sept. Quarter		January-June		July-December		YEAR (July-June)	
	1959	1958	1959	1958	1959	1958	1959	1958	1958	1957	1958-59	1957-58
Alabama	-----	59,626*	43,284	53,879	91,258	90,651	846,309	734,077	199,265	172,721	1,045,574	906,798
Arkansas	8,516	12,171	15,112	13,570	41,802	42,100	289,365	226,889	64,092	62,752	353,132	289,641
Georgia	53,112	50,207	22,833	15,206	135,678	107,373	1,130,998	944,618	294,751	269,529	1,425,749	1,214,147
Kentucky	-----	35,459*	25,432	22,624	49,489	38,396	483,821	435,023	99,460	88,771	583,281	523,794
Louisiana	13,982	17,031	12,878	13,650	35,276	29,933	201,642	188,409	64,152	64,192	265,794	252,601
Missouri	66,272	113,535	69,282	105,951	147,812	164,296	563,055	420,615	370,036	335,312	926,111	755,927
N. Carolina	-----	78,008*	34,806	49,929	60,446	89,602	1,468,704	1,261,685	228,055	199,446	1,641,674	1,461,131
Oklahoma	20,242	19,371	29,519	29,273	45,939	43,410	64,738	55,964	68,848	51,436	133,586	107,400
S. Carolina	13,232	34,630	22,994	29,006	47,443	58,100	756,100	615,733	134,202	116,874	890,302	732,607
Tennessee	20,472	32,918	36,721	42,042	78,916	79,343	443,602	307,182	127,116	135,717	570,718	442,899
Texas	53,074	52,136	52,426	45,298	115,509	103,794	441,851	452,327	222,800	213,801	664,651	666,128
California	(reports compiled quarterly)				204,000	206,327	803,261	679,577	450,767	441,969	1,254,028	1,121,546
Virginia	(reports compiled quarterly)				68,631	76,031	618,965	549,773	160,178	140,783	779,143	690,556
Indiana	(reports compiled semi-annually)						856,316	795,506	316,341	284,959	1,172,657	1,080,465
New Hampshire	(reports compiled semi-annually)						16,143	16,053	4,746	3,966	20,889	20,019
Washington	(reports compiled semi-annually)						-----	158,286*	75,350	77,498	-----	235,784*
TOTAL	248,902	331,999	365,287	420,428	1,122,199	1,129,356	8,984,870	7,683,431	2,880,159	2,659,726	11,727,289	10,265,659
----- (not yet reported) * Omitted from column total to allow comparison with same period of current year.												

Urea Shows 10% Gain In 1958: 530,327 Tons

Final 1958 production figures for urea, as compiled by the Tariff Commission and reported by U.S.D. C.'s Chemical and Rubber Division, show that output increased 10 percent over that of the preceding year, to 530,327 tons. The rate of growth was somewhat less than in 1957 despite new facilities which came on stream during the year.

Based on capacity in existence at the beginning of 1958, urea plants operated at an average of about 85 percent. In the first half of 1959, production increased some 20 percent whereas capacity has been expanded by 28 percent since the beginning of 1958.

The following grades were produced in 1958 (percent nitrogen): Feed compounds, 14 percent; liquid fertilizer or solution, 24 percent; solid fertilizer, 45 percent; and other, 17 percent. Proportions of feed compounds and liquid fertilizer in the 1958 total were the same as in 1957, but solid fertilizer was up from 37 percent of the total and industrial urea (other) down from 25 percent.

'Super' Production Rose During '58-'59 Year

Trends in production of phosphatic fertilizer materials underwent some changes in the 1958-59 fertilizer year, according to a report of the Chemical and Rubber division of U. S. Department of Commerce's Business and Defense Services Administration.

Output of normal superphosphate increased about 2 percent over that for the preceding year, whereas production of concentrated superphosphate declined about 3 percent. For only the second time in recent years, output of concentrated superphosphate failed to maintain an uptrend.

Diversion of phosphoric acid from manufacture of concentrated superphosphate to shipment for fertilizer mixing undoubtedly has been a prominent factor in the changing trend.

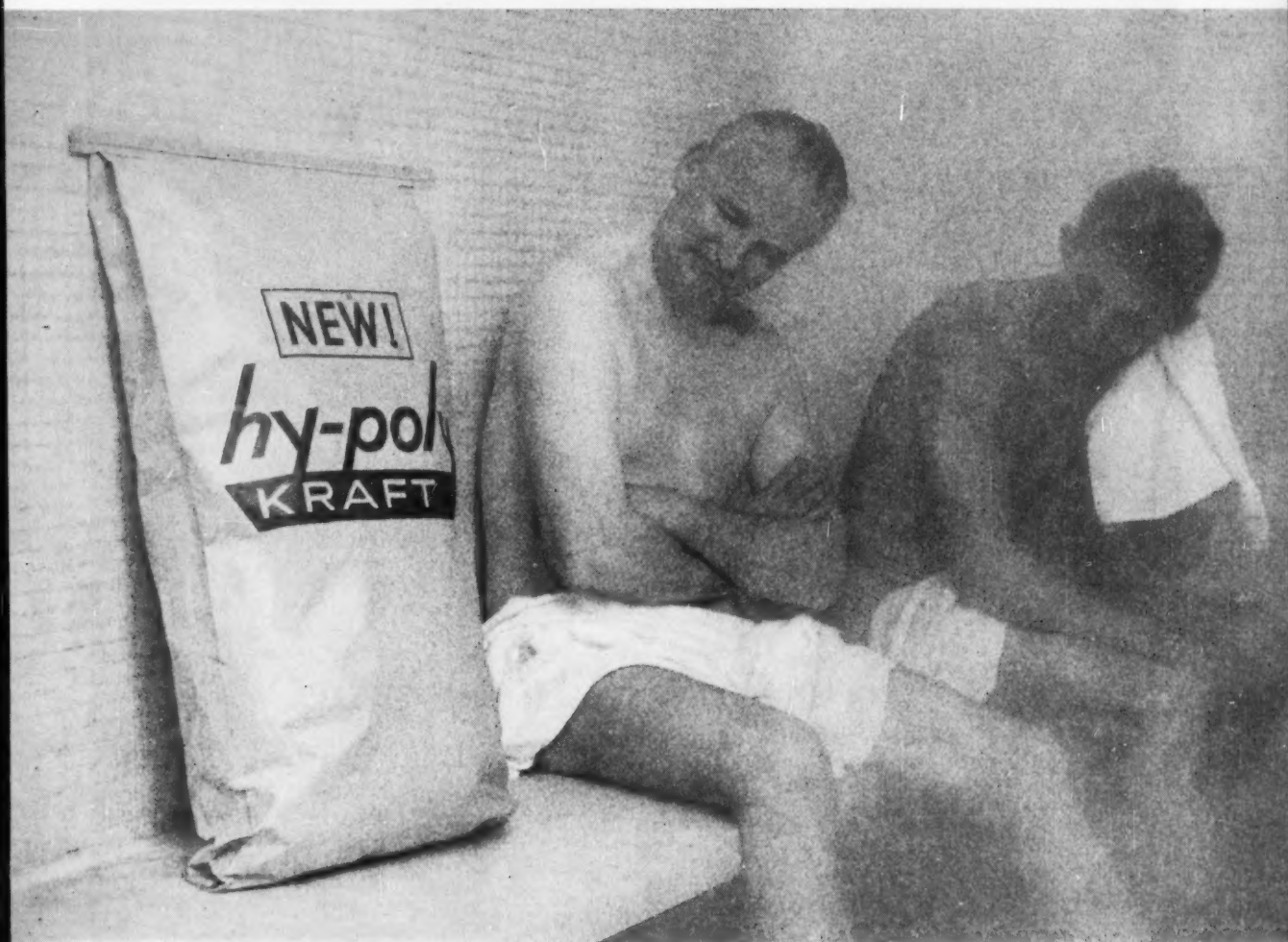
Despite the production loss, 1958-59 shipments of concentrated superphosphate exceeded those of the preceding year by 6 percent in order to meet heavy spring demands. As a result, producers' inventories at the end of June were reduced to about half the quantity on hand a year ago.

Potash Deliveries Up 60% In 9-Month '59 Period

Deliveries of potash for agricultural purposes in the United States, Canada, Cuba, Puerto Rico, and Hawaii by the eight principal American producers and also the importers totaled 2,819,951 tons of salts containing an equivalent of 1,655,018 tons K₂O during the first nine months of 1959, according to the American Potash Institute. This was an increase of 6% in salts and K₂O over the same period in 1958. Continental United States took 1,559,781 tons K₂O, Canada, 53,356 tons, Cuba, 5,381 tons, Puerto Rico, 18,389 tons, and Hawaii, 18,111 tons K₂O. These figures include imports of 112,339 tons K₂O for only the first six months of the year. Exports to other countries were 204,979 tons K₂O. Deliveries of potash for non-agricultural purposes amounted to 107,743 tons K₂O, an increase of 33% over last year. Total deliveries for all purposes were 3,336,885 tons of salts containing an equivalent of 1,967,740 tons K₂O, an increase of 8% in salts and K₂O.

During the third quarter of 1959, deliveries for agricultural purposes were 400,089 tons K₂O in continental

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United States, 9,237 tons in Canada, 2,022 tons in Cuba, 1,594 tons in Puerto Rico, and 4,706 tons in Hawaii making a total of 417,648 tons K_2O , a decrease of 1% under last year. Import figures for the third quarter of the calendar year are not available at this time. Exports of potash to other countries during the third quarter were 84,985 tons K_2O ,

an increase of 23% over last year. Deliveries of potash for non-agricultural purposes were 32,615 tons K_2O , an increase of 14% over last year. Total deliveries for the third quarter were 904,207 tons of salts containing an equivalent of 535,248 tons K_2O , an increase of 3% over last year.

REGULATIONS & TONNAGE REPORTS

New Hampshire Revises Rules and Regulations

New rules and regulations for the New Hampshire fertilizer law, to be effective January 1, 1960, have been announced by George H. Laramie, state control supervisor.

Significant differences between the old and new law include: (1) An increase in registration fee from "\$10.00 per element, not to exceed \$25.00 per brand" to a straight \$10.00 per element claimed—in effect removing the former limit of \$25.00 per brand. (2) Allowance of special mixes upon permission from the Commissioner of Agriculture. (3) Changing of several words in the law that were inconsistent with words used in the fertilizer trade, such as changing "complete fertilizer" to read "mixed fertilizer," and deleting the word "material" from a reference to animal and bird manures. (4) Allowance for registration "under protest."

Those interested in obtaining more detailed information on the changes in the law can obtain a copy of the new regulations by writing to Mr. Laramie at Room 120, State House, Concord.

S.C. Approves New Ratio, Changes 'Specialty' Rules

At a recent meeting of the Fertilizer Board of Control of South Carolina, the group approved addition to the present list of a new ratio, 4-1-2, with a minimum analysis grade of 16-4-8. The approval was made effective November 1, 1959.

In another action, the Board also issued the following ruling, effective the same date, in regard to specialty fertilizers:

"With respect to 'specialty fertilizer' as defined in Section 2G of the South Carolina Fertilizer Law of 1954, when such specialty fertilizer is sold only in packages of 25 pounds or less, the term 'grade' will be taken to mean the percentage of total plant nutrients. The minimum

shall not be less than 20. The registrant may vary the proportion of the plant nutrients as contained in the different types of specialty fertilizer marketed by him by designating each product by brand name. Each brand must be registered."

Companies contemplating the sale of specialty grades should submit a sample of the label and the product along with the registration form. For packages weighing ten pounds net or less the \$10.00 registration fee suffices for the registration and the inspection tax, regardless of the amount sold. For packages weighing more than ten pounds a registration fee of \$1.00 plus 25¢ per ton is charged. A copy of the invoice is also due within 48 hours after a shipment is made.

Alabama Fiscal Year Tallies 13.6% Gain

The Alabama Department of Agriculture and Industries, operating on an October 1-September 30 fiscal year, reported last month that fertilizer tonnage for their 1958-59 year totaled 1,046,166 tons, up 13.6% from the 920,775 tons recorded for the 1957-58 fiscal year.

Third Quarter Sales Up 29% in Kentucky

Fertilizer sales in Kentucky for the quarter ending September 30, 1959 showed a substantial increase over the same period in 1958, the Department of Feed and Fertilizer reports.

Sales of 49,489 tons were 29% above the 38,396 tons reported for the same quarter of 1958. Tonnage during the 1958 quarter had been substantially the same as that tallied for the third quarters in 1957 (38,975 tons) and 1956 (38,271 tons).

The monthly breakdown of 1959's third quarter showed the following monthly totals: July, 7,093 tons; August, 16,964 tons; and September, 25,432 tons. The monthly increases amounted to 30%, 64% and 12% respectively over the same months in 1958.

Bruce Poundstone, head of the

Department of Feed and Fertilizer, cites the encouraging fact that farmers are not only buying more high-analysis goods than formerly, but are following the recommendations of the Experiment Station. Ten years ago, less than 20% of the tonnage was in recommended grades; during the 1958-59 season, more than 86% of sales were of recommended grades.

He reports further that 1:1:1 ratios in analyses totaling 30 units or more of plant nutrients accounted for 58,000 tons in the initial half of 1959, a 41% increase over the same period a year earlier. The 5-20-20 grade also showed a significant 39% increase, to 19,000 tons in the 1959 spring season, while use of 6-12-12 increased 36% to 31,700 tons.

Mississippi Shows Gains In Mixed Goods Sales

Figures released last month by the Mississippi Department of Agriculture showed the 1958-59 fertilizer tonnage as 693,288 tons, a gain of 8% over the preceding year.

Mixed goods accounted for all of the increase with 52,100 more tons being sold this year, offsetting the decrease of 74 tons of fertilizer materials.

One-third of the total sales of mixed goods was made during the month of April and 61 per cent was made during the months of March and April.

Nitrogenous products led the field of fertilizer materials in 1959 with 35% of the total sales being ammonium nitrate and about 11% each for nitrate of soda and anhydrous ammonia.

Twenty-two percent of the total materials sales was basic slag, eight percent superphosphate and four percent muriate of potash.

The grade 4-8-4 was the number one seller through 1943, 6-8-4 took the lead in 1944 through 1946, 5-10-5 in 1947 through 1952, and 6-8-8 has occupied the number one spot since.

Virginia Analyzes Increase In 1958-59 Consumption

Use of mixed fertilizer and materials increased about 12 per cent in Virginia for 1958-59 as compared with 1957-58. Tonnage in 1958-59 was 779,143, compared to 690,556 for 1957-58. Actually the increase in plant food is much higher because fertilizers of higher analysis were used.

The big increase in tonnage was in 0-1-2, 1-3-6, 1-2-2, and 1-1-1 ratios; 0-10-20, 3-8-18, 5-10-10, 10-20-

20, and 10-10-10 have shown considerable increase. About 90 per cent of the tonnage of fertilizer sold in Virginia is in about 12 grades. At present 5-10-10 is the most popular grade, accounting for about 25 per cent of the tonnage.

While 1958-59 tonnage lagged considerably behind the all-time state record of 857,192 tons sold in 1951-52—and actually behind all the four crop years from 1951-52 thru 1954-55—it did establish a new record for plant nutrient consumption. An average plant food content of 25.89% in 1958-59 pushed plant nutrient consumption to 201,725 tons, substantially above the 191,698 tons of plant nutrients sold in 1952-53, when the average content of mixtures and materials was only 22.97%.

The 1958-59 figures set a new record for nitrogen (42,729 tons) and potash (81,631 tons), but the 77,364 tons of P_2O_5 was well under 1951-52's 90,333-ton record.

Wisconsin Shows 9% Gain To 474,255 Tons in '58-'59

A record total of 474,255 tons of commercial fertilizer was delivered in Wisconsin in the 1958-59 fertilizer year, Walter B. Griem, chief chemist of the feed and fertilizer section of the Wisconsin Department of Agriculture, reports. The record represents an increase of 8.7 per cent over the 436,108 tons sold the previous year. Of the total used during the year, 96,804 tons were fall-delivered.

The actual plant food distributed shows an even larger increase—12.2 per cent—with the fertilizer averaging 41.5 units of plant food this past year as compared to 40.28 units in 1957-58.

The most popular grade of fertilizer continues to be 5-20-20 with a total of 120,067, an increase from the 112,023 tons used the preceding year. The 6-24-24 grade was second with 37,242 tons. These were followed by 10-10-10, 4-16-16 and the old favorite, 3-12-12, which is rapidly declining in tonnage.

A small increase in phosphate and potash mixtures to 85,472 tons was reported. The 0-10-30 grade, with 34,155 tons, was most used. There was a substantial increase in the amount of unmixed materials sold in the state from 37,439 to 47,571 tons. Some of the larger items in this class of materials are 16,785 tons of 60 per cent muriate of potash; 8,714 tons of ammonium ni-

trate; 4,903 tons of nitrogen solutions and 4,675 tons of anhydrous ammonia.

Bulk-delivered mixtures and materials almost doubled during the past year, with 40,962 tons or 8.6 per cent of all fertilizer falling in

that category. In the liquid mixed fertilizer classification, 5,643 tons were sold this past year as compared with 5,472 tons the preceding year. A relatively high total of 8,287 tons of fertilizer with insecticide was used in Wisconsin.

S. C. Plant Food Educational Society Meeting Draws 500

The tenth annual meeting of the South Carolina Plant Food Educational Society was held in Clemson, November 9, presided over by President J. Chiles Calhoun of Hartsville.

Highlights of the program were a discussion of "Equipment for Precision Seed and Fertilizer Placement" by Charles W. Gantt, research agricultural engineer of the USDA in Athens, Georgia. Dr. Gantt pointed out the importance of placement emphasizing that more attention would have to be paid to this item by farmers in the future because of the increasing use of plant nutrients and the increasing plant nutrient content of fertilizer materials. Dr. Gantt's discussion was illustrated by an excellent set of slides which had been prepared by the American Potash Institute.

The remainder of the program was devoted to a discussion of South Carolina's intensified soil fertility program. Leading off on this topic was Extension Agronomist, H. A. Woodle, who discussed the accomplishments that the program has brought about and the plans for the future.

Norwood R. Page of the Soil Testing Laboratory then presented some data showing the fertility level of the soils in the three counties which now have the program underway.

The value of this program to the farmers in other segments of the economy in South Carolina was next discussed by Mr. Luther P. Anderson, Assistant Extension Agronomist, using slides prepared by the National Plant Food Institute.

"How the Program Worked in Edgefield County" was next discussed by County Agent, O. W. Lloyd.

Alex Bauknight, County agent in Lexington County and J. N. Davis of Leesville, South Carolina next pointed out what was taking place in Lexington County, the latest of the counties to undertake the soil

fertility program. Unique about the Lexington County program is that Mr. Bauknight and Mr. Davis have secured the cooperation of the Vocational Agricultural Teachers, the Soil Conservation Service, and the ASC office, and other county agriculture workers in carrying this program out.

"How a Fertilizer Manufacturer Sees the Soil Fertility Program" was next discussed by D. H. Banks of St. Matthews, South Carolina, urging full support of this program by all of the fertilizer industry in South Carolina.

Rounding off the morning program was a discussion on "Intensified Soil Fertility Programs—A Valuable Educational and Sales Tool" by Dr. M. S. Williams, Chief Economist of the National Plant Food Institute.

The afternoon was spent in a tour of the Poole Agricultural Center, the Soil Testing Laboratory, the Fertilizer Department, the Green Houses, and the Processing Laboratory. That evening the social hour was given by the nitrogen producers after which the annual banquet took place. The featured speaker of the evening was Lieutenant Governor Burnet R. Maybank who discussed the importance of a sound agriculture to the entire economy of South Carolina.

Fertilizer Dollar Bill from NPFI

National Plant Food Council is issuing a fertilizer "dollar bill" which stresses that the increase in active plant food per ton has offset the cost per ton to the point where the cost is 2% less than it was in 1939. The "bills" come as gummed labels, or as tags.

N from Solar Energy

Red China is reported to be using solar energy, combined with bio-energy to produce nitrogenous fertilizers.



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If your fertilizer plant is located in the Midwest, you've seen many a U.S.I. tank car in freight trains speeding across the countryside. The traditional U.S.I. oval is a familiar symbol of dependable, prompt service from our three plants in your area.

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USI

Roy A. Parker has been named Kansas City Sales division manager



Parker

Joseph G. Longstreth has been named manager of the St. Louis, Mo. sales office. He will report to Roy Parker. Mr. Longstreth has been a sales representative for the company in the St. Louis area since he joined U. S. I. in 1955.



Putnam

John A. Putnam has been appointed manager of the Atlanta office. Mr. Putnam has been a salesman operating out of the U.S.I. New Orleans Sales Division since 1952 and has been located in Atlanta for the past two years. All three announcements were made by A. R. Ludlow, Jr., vice president in charge of sales.

National Potash

Thomas G. Ferguson has been elected president and chief executive officer of National Potash Company. The announcement was made by Richard C. Wells, former president, who was elected chairman of the board.



Ferguson

Mr. Ferguson joined National Potash Company as vice president and general manager when the company was formed in 1955. He has been in charge of the development and operation of the company's mine and refinery 32 miles east of Carlsbad, New Mexico. In his new capacity Mr. Ferguson will continue to make his headquarters in Carlsbad.

PEOPLE in the Industry

NCI

F. L. Litty was elected president of Northern Chemical Industries, Inc. at the company's annual meeting. He succeeds James E. Totman, chairman and president of the firm since its organization 15 years ago. Mr. Totman continues as chairman and will share executive responsibilities with Mr. Litty.

Other officers elected were Ralph E. Fraser, vice president and assistant treasurer; Donald Fangmeyer, vice president, sales; Wm. A. Fessler, secretary; George Gump, assistant secretary; and John Heinlein, assistant treasurer.

Davison

Two changes in personnel in the Davison Chemical Co. Division of W. R. Grace & Co. became effective Nov. 1.

John W. Ground III is transferred and promoted to manager of the Lansing, Mich. plant and sales territory. He replaces the late Barnard C. Manker.

James A. Doyle succeeds Mr. Ground as manager at Joplin. Prior to joining Davison in 1952, Mr. Doyle was affiliated with Mathieson Chemical Co.

Richmond Guano

James H. Pate was elected secretary of the Richmond Guano Company November 2.

Since 1949 he has been active in the fertilizer industry.

He has been associated with the Richmond Guano Company since February, 1958. In his new position, Mr. Pate will be in charge of sales.

Dorr-Oliver

At its November meeting, the board of directors of Dorr-Oliver Incorporated appointed J. D. Hitch, Jr., president to fill its vacant board chairmanship and elected L. R. Boling, currently executive vice president, to succeed Mr. Hitch as president. Both appointments became effective on December 1, with Mr. Boling continuing as chief executive officer of the internationally known engineering concern. Dr. John V. N. Dorr and Wm. L. Oliver will continue as honorary chairman and vice chairman of the Board respectively.

Raymond Bag

D. F. Wicks, general sales manager of Raymond Bag Corporation, Middletown, Ohio, a division of Albemarle Paper Mfg. Company, announced the following changes in Raymond's sales organization:

C. R. Keener has been appointed salesman in the Central district, which has headquarters in Louisville, Kentucky, representative in the Southern Ohio, Southern Indiana, and Northern Kentucky area.

Ralph T. Rose recently joined as salesman in the Midwestern district, representing Raymond in the Chicago, Wisconsin area.

George Clifton has been appointed salesman in the Midwestern district. Mr. Clifton's area is Michigan and Northern Indiana.

Calspray

Dale Huntsman, plant manager for California Spray-Chemical Corporation's Richmond plant, recently announced the appointment of James B. Stichka as plant superintendent of the Richmond fertilizer manufacturing operation.

IMC

The Plant Food Division of International Minerals & Chemical Corporation has announced promotion of two men in its Skokie, Illinois, headquarters.

John D. Zigler, general manager of the division, appointed Fred J. Jilek inventory control coordinator, and Henry F. Eizenga administrative staff assistant.

Mr. Jilek came to IMC in 1942. Mr. Eizenga joined them in 1952.

Sou. States

Southern States Phosphate & Fertilizer Company has appointed John



Carpenter

A. Carpenter to their sales staff. He will work directly out of their Savannah, Ga. sales office.

Mr. Carpenter is a graduate of North Carolina State College and has a B.S. Degree in Soils. He was recently associated with the Virginia-Carolina Chemical Company, working out of Rome, Ga.

Nordberg

Appointment of Harold N. Propp as assistant Western branch manager in San Francisco and Eugene T. Daum as sales engineer in the St. Louis Office was announced recently by D. A. Cheyette, vice-president, Nordberg Mfg. Co., Milwaukee, Wisconsin.

Monsanto

Two promotions to district sales positions in Monsanto Chemical Company's inorganic chemicals division agricultural chemicals sales group were announced by James E. Crawford, division director of marketing.

Joseph W. Tripp joins the Los Angeles District sales office, replacing Ben W. Martin, who has been promoted to product supervisor, anhydrous ammonia, nitrogen solutions and nitric acid, with headquarters in St. Louis.

Roger L. Weinheimer goes to Denver, replacing John S. Moore Jr., who has been transferred to St. Louis as product supervisor, ammonium nitrate and urea.

Fisons

Sir Noel Hall has joined the board of Fisons of Britain. He will continue as principal of the administrative staff College at Henley-on-Thames, an appointment he has held since 1946.

The Court of Governors of the College has agreed that Sir Noel should accept the appointment. This, it states, is in accordance with the general policy of the College which encourages senior members of its staff to undertake suitable additional duties where these contribute to the practical character of the course of studies.

Agrico

William B. Tavenor has joined the agronomic service division of The American Agricultural Chemical Company as turf and garden agronomist. Dr. D. P. Satchell, Agrico's director of agronomic services, made the announcement.



Tavenor

Mr. Tavenor will direct field service activities for Agrico's turf and garden department, in conjunction with fertilizer sales and service personnel in the field. He will headquarter in the Company's New York office.

Geigy

Dr. Charles R. Hunt has joined Geigy Agricultural Chemicals, division of Geigy Chemical Corporation. Dr. Hunt will work for the research department as technical field representative in Montana, North and South Dakota, Wyoming, Minnesota, Iowa, Nebraska, Kansas, and Colorado.

Sole Chemical

Sole Chemical Corp., Chicago, announces the appointment of Jack H. Bell to the technical sales staff, covering the Minnesota, Wisconsin, Michigan, Illinois, and Indiana area.

Stauffer-Victor

The directors of Stauffer Chemical Company November 2 elected August Kochs vice chairman of the board of directors and Rothe Weigel a senior vice president of the Company and president and general manager of the Victor Chemical Works Division (see "Changes"). Prior to the merger of Victor Chemical Works into Stauffer Chemical Company on November 1, Mr. Kochs was chairman of the board and Mr. Weigel, president of Victor.

The directors also elected a number of other new company and divisional officers: Their names and titles are:

Raymond L. Geiler, vice president & general manager A. R. Maas Chemical Division; Morris R. Stanley, vice president-sales Victor Chemical Works division; Francis M. Anable, vice president-production, Victor Chemical Works division; Donald G. Brower, asst. vice president-research Victor Chemical Works division; Sam S. Emison, vice president-marketing; Herman P. Jockers, vice president-production; Roger W. Gunder, vice president-sales Industrial Chemicals division; William Engs, vice president-production Industrial Chemicals division; Donald G. Ellis, vice president-Western sales; James W. Kettle, vice president-finance; Lloyd F. Cummings, asst. vice president-finance; Tolman G. Everett, treasurer; Richard N. Stillman, controller; Arthur H. Swanson, assistant treasurer-director, Credit & Insurance; Frank A. Schwerdt, assistant treasurer; Herbert A. Flodin, assistant controller; Fred W. Hansen, assistant secretary.

Of the new appointments listed above, Messrs. Geiler, Stanley, Anable, Brower, Everett, Schwerdt, Flodin, and Hansen were formerly officials of Victor.

Armour



Ziegler



Foster



Brooks



Chandler

W. J. Foster has been appointed manager of the Columbia, S. C. Division of Armour Agricultural Chemical Company, according to an announcement by H. Vise Miller, vice-president and general manager of the Armour Fertilizer division. Mr. Foster replaces Paul J. Ziegler, who is retiring after 34 years of service as salesman and manager of the Columbia division, Mr. Miller explained.

Mr. Miller also announces the transfer of A. W. Chandler from his position as manager of the San Juan, Puerto Rico, division, to sales manager of the Greensboro, N. C. division, under H. H. Kemp, division manager. Mr. Chandler will be succeeded in the San Juan division by Charles M. Brooks.

The changes will become effective immediately.

US Borax

T. M. Cromwell has been appointed process superintendent in the production department at the United States Borax & Chemical Corporation refinery at Boron, Calif., it is announced by W. J. Diffley, resident manager at Boron. Mr. Cromwell had been manager of the chemical engineering research department.

Succeeding him in the managerial post is D. L. Sawyer, who had been serving as section head in process improvement research at the Boron facility.

Promotions of three staff scientists at U. S. Borax Research Corporation, a subsidiary of United States Borax & Chemical, are announced by Dr. C. L. Randolph, vice president.

Dr. Edgar Fajans, formerly associate director of chemical research,

will be special assistant to the vice president.

Named as associate directors of chemical research are Drs. Howard Steinberg and A. L. McCloskey. Dr. Steinberg has been serving as assistant director of chemical research. Dr. McCloskey held the post of senior group leader in chemical research.

AP & C

Robert P. Rice, formerly chief chemist at American Potash & Chemical Corporation's Henderson, Nev., plant, has been transferred to the firm's Los Angeles sales office where he will provide technical sales service to the company's ammonium perchlorate customers. W. M. Clines, general sales manager, Western, for AP&CC, announced the transfer.

Pollard

The appointment of Fred L. Evans to the position of sales manager of Pollard Manufacturing Company's fertilizer division has been announced by Martin L. Luther, Pollard's president.

According to Mr. Luther, Pollard is presently engaged in reorganizing and streamlining its fertilizer division to better serve the needs of the rapidly expanding fertilizer industry. Mr. Evans for the past several years has been associated with Dempster Mill Mfg. Company.

Bunker Hill

William G. Hewitt, marketing analyst for The Bunker Hill Co., has been appointed assistant to president John D. Bradley. He becomes general manager of Kellogg operations on Jan. 1.

Mr. Hewitt will continue to work with problems pertaining to Bunker Hill's entry into the fertilizer industry, on diversification with Harold E. Lee, Bunker Hill vice president, and on marketing.

Chippewa Plastics

George N. Keyser, sales manager for Arkell Safety Bag Company of Chicago, has joined the sales staff of Chippewa Plastics Company, a division of Rexall Drug and Chemical Company, as product sales manager for industrial products, George Dingman, general manager of the Chippewa Falls firm, announced.

In his new position, Mr. Keyser will be concerned with developing new applications for the heavy-duty polyethylene industrial bag used for bulk packaging of such products as ammonium nitrate.

Sulphur Export

Election of Peter A. Dimitri and Ernest A. Graupner as vice presidents of the Sulphur Export Corporation (Sulexco) has been announced by B. C. Hughes, chairman. Mr. Dimitri has been director of sales of Sulexco since its inception in 1958. He was formerly with Freeport Sulphur Company which he joined in 1953.

Mr. Graupner comes to Sulexco from the Texas Gulf Sulphur Company which he joined earlier this year. Previously, he served twelve years as Export Manager of American Potash & Chemical Corporation.

Hector

Hector Supply Company, Miami and Belle Glade, Fla., has made three new appointments. They are J. M. Bellows, general manager of the fertilizer and chemical division; Sam H. Vaughn, purchasing and production manager, and Carl E. Reger, executive vice president.

W. Va P & P

J. R. (Dick) Jones has been promoted by West Virginia Pulp and Paper Company to sales manager for the Kansas City district of its multiwall bag division, it was announced by Tom L. Jones, regional sales manager.

He succeeds Roy E. Jury, who has been named district sales manager for Westvaco's Hinde & Dauch container division on the West Coast.

Smith-Douglass

John Floyd has been promoted to the position of technical service manager for the Wellsburg, W. Va. and St. Louis plants of the multiwall bag division, it was announced by Sheldon Y. Carnes, regional manager. The position is a new one, Mr. Floyd joined them in 1954.

Smith-Douglass

Carl G. Prendergast has been appointed assistant general traffic manager for the Smith-Douglass Company, Operations vice president J. A. Monroe has announced. Smith-Douglass' general traffic manager is Robert V. Peabody.

C. D. (Chuck) Austin has been named sales training director for the Midwest sales area, M. W. Mahwinney, manager of Smith-Douglass Streator, Illinois plant, has announced. Mr. Austin joined Smith-Douglass in 1953 and has supervised Iowa and Illinois sales territories since.

obituaries

John D. Bradley, 49, died in an auto crash at San Francisco November 26. He was president of Bunker Hill Co., which is building a fertilizer plant at Kellogg, Idaho.

James Wallace Dean, 88, died suddenly October 12 at his home, Knoxville, Tenn. He was head and active in management of Knoxville Fertilizer Co. until its purchase by American Agricultural Chemical Corp.

Raymond C. Ellis, 80, for 45 years with Hopkins Fertilizer, and until his retirement president of Ellis Chemical Co., which he founded. He died November 11, at New Albany, Ind., after a long illness.

Dr. Jess R. Keinholz, 55, a leading authority on plant pathology, died November 1 at his home, Hood River, Oregon, where he had been head pathologist of the Mid-Columbia AES for 28 years.

Dr. William H. Schuette, 47, general manager of Dow Chemical's Midland division, died November 8 after a heart attack.

Kraftpacker's New Unit Adds Wet or Dry Pesticides

Kraft Bag Corporation, exclusive sales agents for the Kraftpacker automatic open mouth bag filling machine, announces the development of 2 new Kraftpacker attachments—one to add and mix a desired amount of regular or pulverized insecticide or herbicide to each bag of fertilizer as it is filled by the Kraftpacker—the other to add liquid insecticide or herbicide to the fertilizer. The amounts of either type can be carefully controlled according to the requirements of the packager.

Since effective adding and mixing of these materials to fertilizer have long presented a problem to fertilizer manufacturers, Kraft Bag Corporation views these attachments as a definite contribution to the fertilizer industry.

The Company also feels that the same attachments can be effectively employed to add concentrates to various mash and unpeletted feeds. Kraft Bag Corporation, integrated manufacturer of multiwall shipping sacks, is a subsidiary of Gilman Paper Company, with plants at St. Marys, Georgia and Gilman, Vermont. New York headquarters are at 630 Fifth Avenue. Western Sales office is in the Daily News Building, Chicago 6, Ill.

Speed handling, reduce pile set with Du Pont URAMON[®] Ammonia Liquors

You can keep production fast-moving and your fertilizer free-flowing with the added conditioning benefits of Du Pont "Uramon" Ammonia Liquors.

UAL helps to prevent the cementing, pile-setting action that often results from some other nitrogen formulations. As mixtures ammoniated with UAL cool, residual moisture combines with the compounds formed—leaving a dry mix remarkably free of excessive caking, segregation and dusting. Result—your UAL goods suffer less pile set, seldom require blasting and can be moved readily by the payload.

In addition, Du Pont "Uramon" Ammonia Liquors are non-corrosive, can be used in ordinary steel equipment. Secondary set and caking in the bags are also minimized because the urea from UAL is non-reactive with other fertilizer ingredients. And UAL mixtures are highly drillable.

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fits of UAL begin. UAL provides nitrogen in both the urea and ammonium form—nitrogen that becomes available at a rate closely paralleling plant requirements. Nitrogen from Du Pont UAL is also leach-resistant; remains in the root zone long after other forms have been exhausted.

Du Pont UAL is available in five forms, including UAL-37 for even more gradual nitrogen release, and UAL-S with the added conditioning effects of ammonium sulfate. For information on which type is best suited to your needs, write Du Pont.

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INDUSTRY CHANGES

Armour Realigns into Two Major Divisions



James



Miller



Machen



Moore

As reported briefly last month, a major realignment of the Armour Agricultural Chemical Co. has been announced by its president, W. E. Shelburne, including naming of four top executives and organization into two major divisions,—fertilizer and nitrogen-phosphate.

The Fertilizer Division will include Armour's 27 complete fertilizer manufacturing plants in the United States as well as one in Cuba and one in Puerto Rico.

The nitrogen-phosphate division will include Armour's newly-acquired nitrogen plant in Crystal City, Missouri, and phosphate mining and processing facilities in Bartow, Florida, and Columbia, Tennessee, and a triple-superphosphate manufacturing plant at Bartow.

Company executives appointed to newly-created positions under the new organizational structure are: H. Vise Miller, of Atlanta, named vice-president and general manager of the fertilizer division; Robert L. James, of Atlanta, vice-president and general manager of the Nitrogen-phosphate division; Bernard M. Machen, of Crystal City, Missouri, sales manager of the nitrogen division, and John E. Moore, of Atlanta, assistant to the president.

The appointments are effective immediately, Mr. Shelburne said.

Armour Agricultural Chemical Company was formerly known as Armour Fertilizer Works.

Officially Now It's Auburn

Alabama Polytechnic Institute, like many a commercial product, has finally changed its name to what everybody was calling it anyhow ... Auburn.

Grace Establishes New Sales District

Creation of a new sales district to keep pace with a greatly expanded market for its products, has been announced by W. R. Grace & Co., Grace Chemical division, Memphis, manufacturers of industrial chemicals, fertilizers and urea feed compound. Office of the new sales district is at 8230 Forsyth Avenue, St. Louis 24, Mo.

The new office is headed by Robert L. Tilton as district sales manager and will cover Kansas, Missouri, Kentucky and the southern half of Illinois and Indiana. Mr. Tilton is assisted by J. D. Leeke.

In addition to serving present customers of Grace within the district, new distributorships will be established for anhydrous ammonia and urea prills.

Campbell Fertilizer Adds "Feed" to Name

Campbell Fertilizer Company, Inc., Gueydan, La., has filed articles with the office of the secretary of state at Baton Rouge, La., changing its corporate name to Campbell Feed and Fertilizer Company, Inc.

Central Chemical Buys Green Leaf Plants

Central Chemical Corporation, Hagerstown, Maryland, announces the purchase of the plants of the Green-Leaf Fertilizer Company located at Lockwood, Ohio, and Andover, Ohio. In addition to Fertilizers, Central will add a complete line of agricultural chemicals at these plants and will serve the Lake District from Cleveland, Ohio, to the New York line.

In addition to the plants of the Green-Leaf Fertilizer Company, Central has recently acquired the plant of the Koller Fertilizer Company, Glen Rock, Pennsylvania, which will serve the rich York County area, and is operating a plant at Bridgeville, Delaware, formerly owned by Newton Chemical & supply Company. This plant will serve

the Eastern Shore of New Jersey, Delaware, Maryland, and Virginia.

Central has just completed an expansion program at its Hagerstown, Maryland, plant which will double its capacity for the grinding of 75% DDT Wettable Powder and other related air-mill products. 75% DDT is sold primarily to the United Nations and other Government Agencies. This expansion makes Central one of the largest custom grinders in the United States.

In addition to the plants above, Central Chemical Corporation operates at the following points:

Hagerstown, Maryland; Gettysburg, Milton, Everett, and Butler Pennsylvania; Barker and Alton, New York.

Southern States Buys Another Plant in Virginia

Southern States (Cooperative Fertilizer Service) of Richmond, Va. has purchased the Harrisonburg, Va. fertilizer plant of Central Chemical Corp. of Hagerstown, Md. for about \$400,000.

St. Regis Purchases Carry On As Subsidiaries

St. Regis Paper Company announces Lone Star Bag and Bagging Company of Houston, Texas, and Wagner Bag Company of Salt Lake City, Utah, which it acquired recently, will continue operations as subsidiaries of St. Regis with their present management.

Herbert Levy, formerly executive vice president of Lone Star Bag, has been appointed director of central operations to coordinate and guide the overall sales and production of Lone Star Bag, Wagner Bag, and Mid-America Bag. In this capacity, he will work directly with Bernard W. Recknagel, vice president in charge of the St. Regis Bag Division. Mr. Levy will make his headquarters in Salt Lake City.

As a result of these changes, the former Western District of the Bag Division has been redefined to include the area primarily serviced by the St. Regis multiwall bag plants at Los Angeles and San Leandro, California, and Tacoma, Washington. Operations for this area are under Thomas J. Fleischman, director of western operations.

CCA Buys Sandven

The liquid fertilizer plant in Humboldt, Iowa, has been bought from Lowell Sandven by Consumers Cooperative, and he has been retained as manager.

Heller Sale to American Home Prod.

Mrs. Mary K. Heller, owner of the Heller Greenhouse Laboratories, 218 East Pikes Peak Ave., Colorado Springs, Colo., has announced sale to the American Home Products Co., Inc., New York. Price of the transaction was not disclosed.

The Boyle Midway Division of the New York concern will manufacture and distribute the famous "Heller-Gro" from an established plant in Chicago, Mrs. Heller said.

She will become associated with the national firm in promotion and publicity work. For a time she will work in the main headquarters offices in New York City.

Developed by the late Ralph S. Heller, "Heller-Gro" is a 15-15-15 soluble paste fertilizer.

Iowa Farm Supply Changes Name

Farm Bureau Service Company is the name under which all company activities will be carried on by the former Iowa Farm Supply Company.

Hooker Chemical In New York Headquarters

The board of directors of Hooker Chemical Corporation has voted to establish corporate headquarters in New York City some months hence, it is announced by Thomas E. Moffitt, president. The decision involves only some fifteen to twenty people in certain corporate departments out of approximately 461 corporate personnel and a total of about 2550 employed by Hooker at Niagara Falls, Mr. Moffitt said.

Spencer Announces New Directors

Kenneth A. Spencer, Chairman of the Board, announced that, at the annual meeting of the shareholders of Spencer Chemical Company, Harold H. Spencer, Chairman of the Board of Pittsburg and Midway Coal Mining Company, and Arthur Mag, Secretary of the Company and Senior Partner of the law firm of Stinson, Mag, Thomson, McEvers and Fizzell, both of whom had previously served as directors, were elected to fill new positions resulting from an increase in the number of directors. All other directors and officers were re-elected.

Carrier Conveyor Merges With Chain Belt

Merger of the Carrier Conveyor Corporation, a leading manufacturer of vibrating conveyors, and its subsidiary, General Industries, both located at 211 N. Jackson Street, Louisville, Ky., into Chain Belt Company, Milwaukee, was announced by E. M. Rhodes, vice president of Chain Belt's industrial section. The merger is subject to clearance with the Internal Revenue Department as to tax consequences.

Fischer & Porter Distribute Kimble Glassware

Fischer & Porter Co., Hatboro, Pa. has been appointed a distributor of the full line of laboratory glassware manufactured by Kimble Glass Co., Toledo, Ohio, a subsidiary of Owens-Illinois. F&P will carry a complete stock including several new Kimax items.

Many special items of laboratory glass apparatus, including custom glassware, will continue to be manufactured by Fischer & Porter.

All-Iron SELF-PRIMING CENTRIFUGAL PUMPS FOR LIQUID FERTILIZER

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- Light Weight
- Greater Volume
- Compact



FLOMAX 8, All-Iron Self-Priming pump mounted on this Farm Crop Foods Inc., tank truck supplies plenty of volume and the correct pressure for field spraying. FLOMAX pumps from 5,800 to 15,900 GPH are also used for bulk transfer, for unloading tank cars and for general purpose pumping.

MP Pumps—the FLOMAX SELF-PRIMING CENTRIFUGALS—Engine Driven (or belt or electric motor drive) are now the standard for pumping Liquid Fertilizer.

The Open Adaptor: Liquid being pumped can *never* touch the engine shaft or bearing or get into the engine itself.

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1. New General Chairman Elmer Perrine, Nitrogen Division, Allied Chemical Corp., New York, and Ansel Raney, Phillips Chemical Co., Bartlesville, Okla.

2. Speakers: Albert E. Walker, Travelers Insurance Co., New York;

William N. Cox, Jr., Georgia Institute of Technology, Atlanta; Emerson M. Jones, Jr., Allied Chemical, Nitrogen Division, Indianapolis. 3. George Dietz, Fertilizer Mfg. Cooperative, Baltimore, presents plaque to retiring General Chairman George Pelton, Smith-Douglass Co., Inc., Columbus, Ohio.

Elmer Perrine Named Chairman of Safety Section at Annual Meeting in Chicago

Elmer C. Perrine, technical representative for Allied Chemical's Nitrogen Division, was elected general chairman of the Fertilizer Section, National Safety Council, at the section's annual meeting in Chicago October 19-20. Ansel I. Raney, safety director of Phillips Chemical Co., Bartlesville, Okla. was voted into the vice chairmanship of the section, and Gaither T. Newnam, manager of the Insurance Department of Smith-Douglass, Inc., Norfolk, Va. was elected secretary.

Named to the Executive Committee were the following: retiring General Chairman George L. Pelton, personnel director for Smith-Douglass Co. at Columbus, Ohio; Stratton M. McCargo, personnel supervisor, Cooperative G.L.F. Soil Building Service, Ithaca, N. Y.; John S. Mark, production manager, Farm Bureau Cooperative Assn., Columbus, Ohio; C. S. Griffith, superintendent, Virginia-Carolina Chemical Corp., Cincinnati.

F. Wayne High, manager of operations, The Baugh Chemical Co., Baltimore; E. O. Burroughs, Jr., insurance department manager, F. S. Royster Guano Co., Norfolk, Va.; John E. Smith, safety director, Spencer Chemical Co., Pittsburg, Kans.; William C. Creel, safety director, North Carolina Department of Labor, Raleigh; A. B. Pettit, industrial health and safety director, W. R. Grace & Co., New York.

Mike C. Ellison, protection supervisor, Mississippi Chemical Corp., Yazoo City; Roger Hugg, personnel supervisor, International Minerals & Chemical Corp., Skokie, Ill.; Quentin S. Lee, plant food production director, The Cotton Producers Assn., Atlanta, Ga.; Grayson B. Morris, assistant production manager,

Cooperative Fertilizer Service, Richmond, Va.; J. Lauren Shopen, safety director, Consumers Cooperative Assn., Kansas City.

William T. Stone, production manager, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.; George F. Dietz, safety director, Fertilizer Manufacturing Cooperative, Baltimore; Edward J. Largent, Reynolds Metals Co., Richmond, Va.; Carl E. Alkire, superintendent, Davison Chemical Co. division of W. R. Grace & Co., New Albany, Ind.

Norman F. Maddux, manager, Florida Nitrogen Co., Tampa; Frank A. Gerard, safety and health director, Olin Mathieson Chemical Corp., New York; Emerson M. Jones, Midwest technical service supervisor, Allied Chemical Corp., Nitrogen Div., Indianapolis; James W. Smith, production superintendent, Western Phosphates, Inc., Salt Lake City; and Paul T. Truitt, executive vice president, National Plant Food Institute, Washington, D. C.

National Plant Food Institute honored the 1958-59 executive committee members and the program par-

ticipants at a luncheon on the initial day of the meeting. At this time Marshall Peterson, National Safety Council staff representative newly assigned to work with the Fertilizer Section, was introduced.

Paul T. Truitt, NPFI executive vice president, described plans the Institute has for a reporting service on air and water pollution legislation, and plans for a safety handbook similar to the Fertilizer Salesman's Handbook which has met with such outstanding acceptance by the industry.

In his opening remarks General Chairman George Pelton reviewed the activities of the section during the past year. Highlighting the year's program were the five regional accident prevention schools sponsored jointly by the safety section and National Plant Food Institute.

He described the two data sheets issued by the Engineering Committee this year, one covers handling of pesticide materials and the other deals with explosive materials. Mr. Pelton congratulated the Membership Committee on signing up six new firms as members of the section this year, and commended the Training Committee and the others which had functioned so smoothly through his chairmanship.

He expressed the section's gratitude to National Plant Food Institute, which—acting as national representative for the industry—has underwritten the section, and done much to assure its success.

Speakers on the initial afternoon's program were William N. Cox, Jr., professor of industrial safety and engineering at Georgia Institute of Technology, Atlanta; Albert E. Walker, regional supervisor, Trav-

1960 CALENDAR OF EVENTS

Fertilizer Section

National Safety Council

FEBRUARY 4—Executive Committee Meeting, New Florida Hotel, Lakeland, Florida.

JUNE—Executive Committee Meeting; Date to be announced after February meeting.

OCTOBER 17-18—Fertilizer Section National Safety Congress, Chicago, Illinois.

OCTOBER 19—Executive Committee Meeting, National Safety Congress, Chicago, Illinois.

Five regional Supervisory Safety Training Schools were held in 1958 and 1959. Decision as to where these schools will be held in 1960 is expected at the February 4, 1960, meeting of the Executive Committee.

elers Insurance Co., New York; and Emerson M. Jones, Jr., Midwest technical service supervisor for Allied Chemical's Nitrogen Division, Indianapolis.

Mr. Cox began by saying how strongly he believed in the regional approach to schools for fertilizer plant supervisory personnel. When a safety program in an industry begins to limp along, he said, nothing rejuvenates it more than specialized regional training sessions which reach industry personnel who are unable to go to Chicago in the fall

for the section's annual meeting. Professor Cox, who has participated in some of the regional fertilizer schools, stated that the industry has made a start—only a start, but a good one.

Titling his message "Look Below the Surface," and citing the limited benefits of a 'patent medicine' safety program, he urged the engineering approach to safety analysis, describing this approach as a clear-cut, logical type of analysis. Fundamental points of this engineering approach, which can be adapted to

any size operation, he emphasized, are: get the facts, build the team, and solve the problem. Breaking the problem down, he said, enables the company to set up individual targets which can be aimed at with pinpoint accuracy, instead of blasting away at the whole target with 'shotgun' methods. Most troubles can be broken down into a few categories, Mr. Cox concluded: falls of persons, machinery difficulties, lifting problems, and materials hazards.

Mr. Walker, speaking on "Have We Forgotten the Fundamentals?," revealed that the general industrial accident frequency rate rose six percent during the first six months of 1959, while the fertilizer industry frequency rate increased only 3.7%. Stressing what he called the four fundamentals of safety, Mr. Walker said number one was to get executive support. Lagging executive interest may actually be the safety worker's fault, he said, in failing to put in front of the executive what he wants to know. A safety report should be written with the newspaper-writing approach, he said; it should tell the facts as briefly as possible, then retell with more detail, and retell again, expanding still further, so that management can read as little or as much as it wants, but still get the basic facts.

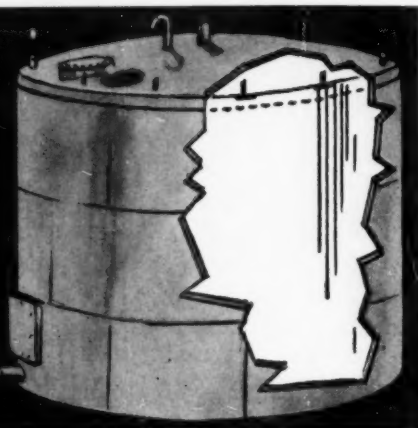
Second, he said, the accident report must be a simplified form that can be made out quickly by those closest to the accident level. Often, advancement in the job of safety only tends to make the reporting form more and more complex.

Third, Mr. Walker emphasized, is the selection and application of a remedy. And fourth is the adoption of executive enforcement, which means developing a program that can be given to line supervisors in a simplified form. In summarizing accident prevention fundamentals, he boiled the formula down to a brief "Find it, Name it, and Fix it!"

"Avoiding Potential Hazards in the Use of Nitrogen Solutions" was Mr. Jones' topic. He covered in complete detail the hazards involved in improperly handling nitrogen solutions, and the precautions which should be followed to insure against exposure of personnel and property to unnecessary risks. His thoroughgoing analysis of potential trouble spots and hazardous situations included the following points:

There should be goggles handy wherever gauges and lines are located. Full protective equipment—including full-face gas mask, gloves

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and non-loose clothing — should be placed in areas where it will be readily accessible in case of trouble. Equipment should be so designed that it can be easily operated and foolproof for operation by employees under panic conditions.

In working with tank cars, he advised that two men should always be used in connecting or disconnecting lines, with one man remaining on the ground; proper lighting should be provided for working in the tank car area at night; and cars should always be disconnected before moving them.

Use of copper, brass, bronze, Monel, zinc, galvanized metals, usual die-castings, concrete and most alloys that may contain any of these materials should be avoided for nitrogen solutions handling.

It's a bad policy to skimp on hose, and anhydrous ammonia hose should be considered if the plant is handling high pressure nitrogen solutions.

Aluminum won't stand the hard use that carbon steel and stainless steel will, so stainless steel valves should be located at critical points in aluminum system installations.

Bleed valves should be installed wherever needed, and pressure should be released before breaking a line. Heat should never be applied to solutions handling equipment for thawing or repairing; for thawing, only hot water should be used; for repair, thorough cleansing and other extreme precautions should be taken.

Gauge glasses should be well protected. In handling liquid ammonia, a pressure relief valve must be included between two closed valves. Emergency showers should be strategically located in the operating area.

In conclusion, Mr. Jones stated that a preventive maintenance program can be a good accident prevention program. Hoses, for example, should be carefully inspected

every 60 to 90 days, or—if this is not possible — they should be replaced after a year's use.

At the Safety Council meeting, mornings are left open for attendance at regular general sessions of the Council convention, and separate sections hold their meetings in the afternoons. The Fertilizer Section's second afternoon meeting got off to a fine start with a group luncheon, where Tom Clarke — a past general chairman and one of the early supporters of the fertilizer safety group — now comptroller of Cooperative G.L.F. Exchange, was the featured speaker. Tracing the history and problems of the fertilizer safety movement, he paced his talk with some of the anecdotes and jokes for which his days in safety work are well-remembered by those who have worked with the section.

Mr. Clarke stated that he and Billy Creel had figured the section has saved the fertilizer industry more than half a million dollars in direct costs . . . but that its main business was people, instilling in them the proper blend of judgment, character and emotion. In this business of safety, he said, there is no room for failure.

He called on the section to clearly outline its goal, to sharpen its public relations, and to design a 1960 model of safety and go out and sell it to the industry.

The second afternoon session found Elmer Perrine, new general chairman, presiding. The program was built around National Safety Council's 'Discussion 66,' where the group is broken up into units of six

men and they have six minute discussion periods to pinpoint a problem; problems are exchanged among groups, and each group has six minutes to come up with an answer—or group of answers—to the problem it has received.

John E. Smith, safety director of Spencer Chemical Company at Pittsburg, Kansas, directed the 66 discussion, with some help from Mr. Perrine in tabulating the answers. Among the problems formulated and solved in the session were the following:

How to get a 100% safety attitude in employees? How to maintain meetings in a small plant (less than seven employees at a time) safety program where there have been no injuries? What is the most effective means to get first-line foremen to place as much emphasis on safety as on production?

What can you do for the old-time 'expert' employee who says an accident can't happen to him? What is the best way to handle leaky or faulty tank cars, especially in unloading operations? . . . and finally, How can we make every fertilizer manufacturer safety-conscious to the point that he will support the Fertilizer Safety Section and its program?

Answers provided by the discussion groups were brief but complete, and very obviously based on a wealth of experience and know-how in fertilizer plants.

After completion of the section's session, the new executive committee met the following day to outline plans for the next year.

CF STAFF SAFETY PICTURES

1. C. S. Griffith, Virginia-Carolina Chemical Corp., Cincinnati; Mike Ellison, Mississippi Chemical Corp., Yazoo City; Bill Stone, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.; H. D. Crawford, Apache Powder Co., Benson, Arizona; and Grayson Morris, Southern States Corp., Richmond, Va.
2. A. B. Pettit, W. R. Grace & Co., New York; John Mark, Farm Bureau Coop. Assn., Columbus, O.
3. Don Hale and Larry Shopen, both with Consumers Cooperative Assoc., Kansas City; Mike Ellison, Mississippi Chemical Corp., Yazoo City.
4. Emory Appling, Cordele, and Quentin Lee, Atlanta, both with Cotton Producers Association.
5. Paul Truitt, NPF, Washington, and Ed Burroughs, F. S. Royster Guano Co., Norfolk.
6. George Mack, Davison Chemical Co., Lansing; Frank Keller and R. W. Seeley, International Minerals & Chemical Corp., Carlsbad.
7. George Dietz, Fertilizer Mfg. Coop., Baltimore; Stratton McCargo, GLF Soil Building Service, Ithaca, N.Y.



TWO-DAY SAFETY SCHOOL HELD IN CALIFORNIA

Fertilizer industry management and local dealers must increasingly recognize the importance of good public relations as well as good safety practices in their areas of local operation. This opinion predominated at the recent Far West Safety School for Accident Prevention held at Fresno and attended by some 50 students from the Far Western States.

L. M. Roberts, General Manager, Ammonia Division, Shell Chemical Corporation, gave management's viewpoint, stressing that, "accidents alienate customers, give a product line a bad name, and if repeated, bring unnecessarily burdensome regulations upon the industry."

H. S. Taylor of Agriform of California, said, "I feel that fertilizer dealers should create an atmosphere of safety among personnel to the extent that the population near their operations need never feel apprehensive."

The two-day school was sponsored jointly by the Fertilizer Section of the National Safety Council and the National Plant Food Institute. William C. Creel, National Chairman of the Council's Fertilizer Section, spoke on "Discovering Accident Hazards" as well as making introductions and outlining the purpose of the school to the students.

A panel discussion on "Fertilizer Safety Practices for Dealers and

Users," was moderated by Austin Cline, Shell Chemical. Sidney H. Bierly, General Manager of the California Fertilizer Association spoke on safety economics on the panel.

John E. Smith, Director of Safety, Spencer Chemical Co., was featured twice at the school, speaking on the plant supervisor's job in teaching safety. Other industry representatives appearing on the two-day program were: Dr. Guy MacLeod, Sunland Industries, who was banquet speaker; Jack Sturgess, Collier Carbon and Chemical Corp., who outlined Collier's safety program; G. Willis Madsen, U.S. Steel Corp., who spoke on safety attitudes.

Orm J. Chinnock, Hercules Powder Co., acted as School Director, and Dr. Richard B. Bahme, NPFI Western Regional Director, cooperated in working up program arrangements.

36th ANNUAL CONVENTION OF CFA

The 500 men and women who attended the Thirty-Sixth Annual Convention of the California Fertilizer Association made it the most successful in the history of the group. Held at the Fairmont Hotel, San Francisco, November 8-11, the convention attracted attendance from all over the United States, and Canada. The principle luncheon speaker was Vince Barnett, famous Hollywood comic and raconteur.

Business session highlights were an address by Joseph E. Burger, director of public relations, H. V. Nootbaar Company, Pasadena; a new film presented by Dr. Russell Coleman, executive vice president, National Plant Food Institute, Washington, D. C.; a report by chairman M. E. McCollam of the Association's Soil Improvement Committee; and the panel discussion on the subject "Technical Progress and Business Stability."

Demont W. Galbraith was elected president for 1960 during the organization meeting of the new board of directors. He is president of Agriform of Northern California, Woodland. Other officers named for 1960 were James F. Sloan, J. F. Sloan Company, Salinas, vice president; Lawrence M. Roberts, Shell Chemical Corp., San Francisco, secretary; John N. Williams, General Fertilizer & Supply Company, Chula Vista, treasurer; and Sidney H.

Bierly of Sacramento was re-elected general manager.

At the annual membership meeting, six directors were elected: John Parker, Fresno Agricultural Chemical Company, Fresno, one year term; L. M. Roberts, two year term; and the following for three year terms: William M. Clines, American Potash and Chemical Corporation, Los Angeles; Sam Mooschekian, Downey Fertilizer Company, Downey; J. F. Sloan, and John Taylor, John Taylor Fertilizers, Sacramento.

This convention was outstanding in its social and recreational events. A "get acquainted" Open House was given by Mr. and Mrs. Lowell W. Berry of The Best Fertilizers Company in their lovely Piedmont home on Sunday evening in honor of president and Mrs. Howard H. Hawkins. Just preceding the banquet in the hotel's Gold Room, the American Potash and Chemical Corporation sponsored a social hour. All in attendance were invited to these two nice affairs. The Association sponsored its annual cocktail hour and luncheon for the ladies in attendance, at the Canterbury Hotel, where a fashion show was a feature. The Banquet itself was very well received, and dancing was enjoyed to the music of Ray Hackett and his orchestra.

Golf tournaments for men and for

ladies, a bowling tournament, and a combination bridge and canasta tournament were recreational features for which prizes were awarded.

Mr. Burger gave the business session a most inspiring presentation on better salesmanship. His title was "How to Get Better." By this he said he meant that the day we stop getting better, we stop being good. There is no such thing as standing still—we either progress or go backward. He said that every successful enterprise combines these three ingredients: the right products; the right methods; and the right men and women. These must be products about which you can be enthusiastic; modern and up-to-date methods; but the most important of all is the right men.

Mr. Burger pointed out that we are all salesmen, regardless of our activities, but the successful salesman has five qualifications: character, industry, ability, courage, and personality—in that order. He said it is important that the salesman have his full quota of sincerity, the priceless ingredient. He must work—work—work, and see the people—see the people—see the people. He should plan his work, and then work his plan—know his stuff and be able to make it clear! "A good salesman is a guy who can sell—without cutting the price! 70% of sales are

made on the second to the fifth calls! Only 30% of new customers are sold on the first call!" He should use his eyes in smiling and in listening, too. "Use your big mouth—learn to keep it shut!" Finally, he said that the true customer is satisfied with your products and service; he likes doing business with you; he believes in and likes you!

Dr. Coleman exhibited here for the first time a new motion picture in color and sound, produced by his organization, entitled "Bread from Stone." He asked for critical comment on a written questionnaire. It was very well received. It pointed out that the countries which employ adequate amounts of commercial fertilizer in their crop production practices enjoy the highest standards of living in the world. In the United States and a few other countries, production of food and fiber is adequate to take care of local needs with some left over for export. The title is worked out by showing the origin of some principle fertilizer materials from ore, or "stone," its processing and formulation into fertilizers; application to crop lands; and finally the grain harvest and then the baking of bread. The film shows that plenty of food is vital to a healthy nation; without technological advancements in agriculture, American housewives would be paying billions of dollars more for food each year; use of chemical fertilizers save the American consumer every year almost twice as much as they cost American farmers; the consumer, not the farmer, is the principal beneficiary of progress in agriculture; in the battle for men's minds, food is our most potent weapon.

McCollam, western manager, American Potash Institute, San Jose, pointed out that the average CFA member pays a very few dollars every year for each of the several very important projects of the Association's Soil Improvement Committee. Among these figures were: \$43.00 of the \$3000.00 annual grant-in-aid to the University of California for specific fertilizer research; \$22.00 for the purchase of fertilizer research equipment which is expanding knowledge in the use of fertilizers, amounting in total to about \$1500.00; \$8.00 for financing the Annual California Fertilizer Conference, which brings the industry the latest fertilizer information; \$6.00 for the Annual Fertilizer Essay Contest, which trains junior college students to appreciate and

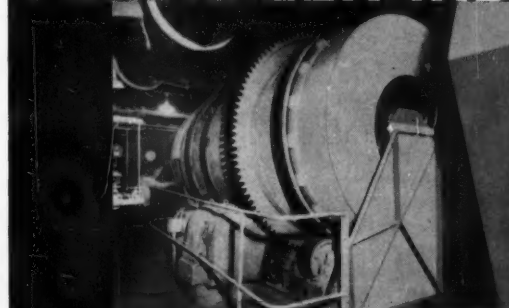
express the advantages of fertilizer use; \$8.00 for the scholarship program in vocational agriculture which interests young people in the field of soils and crops; and for just about no cost at all, the average CFA member shares in the tremendous advantages coming from the distribution of the Western Fertilizer Handbook — "the most outstanding compilation of information ever offered to western growers in the field of soil fertility and plant nutrition." This is a self-liquidating project, as the books are sold at cost.

The panel discussion was moder-

ated by R. L. Luckhardt, supervisor, Agricultural Technical Services, Collier Carbon and Chemical Corporation, Los Angeles. Panelists were Floyd Hornibrook, vice president, research, The Best Fertilizers Company, Lathrop; Dr. Guy F. MacLeod, vice president, Sunland Industries, Inc., Fresno; Dr. Malcolm H. McVickar, chief agronomist, California Spray-Chemical Corporation, Richmond; Lawrence M. Roberts, general manager, Shell Chemical Corporation, San Francisco; James F. Sloan, president, J. F. Sloan Company, Salinas; and William E. Snyder

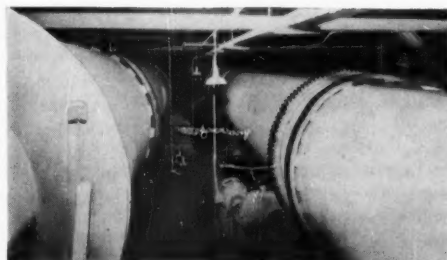
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Each 8' diameter x 50', with 50 HP fluid drives . . . for drying and cooling high analysis chemical fertilizers.

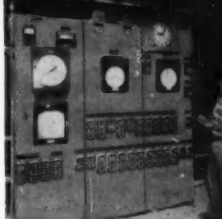
Literature and information on request.

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"Nerve center" of this large Renneburg designed and equipped chemical fertilizer plant. Includes furnace pyrometer; temperature indicating, recording and controlling potentiometers; load indicating ammeter, and start-stop push button stations with signal lights for each machine. Audio-horn warn operators of possible processing difficulties.

er, manager Agricultural Chemical Division, Wilbur-Ellis Company, Los Angeles.

The outlines, evenly divided between technical advances in the industry, and economic problems, were very well received, and they provoked much discussion.

M. E. McCollam, American Potash Institute, Inc., and Dr. Daniel G. Aldrich, Jr., Dean of Agricultural Sciences, University of California, were voted Honorary membership in the Association in recognition of their many years of devoted effort in behalf of California agriculture, and their assistance in CFA programs.

Pacific NW Association Elects Karl Bauer

The following officers and board members were elected at the annual meeting in Yakima, Washington October 15-16: Karl Baur, Pacific Cooperatives, Portland, president; Harold Rud, J. R. Simplot Co., Salem, vice-president; Henning Waltersdorff, Magnolia Fertilizer Co., Seattle, treasurer; Leon S. Jackson, Portland, secretary.

Directors: Two years. Dick South, Hansen & Petersen, Mt. Vernon;; Keith Henson, Collier Carbon & Chemical Co., Yakima; Arthur Burkette, The Chas. H. Lilly Co., Seattle; Ben McCollum, J. R. Simplot Co., Pocatello, Idaho; Trevor Steele, American Potash & Chemical Co., Salem.

Hold-over Directors: Alec Runci-man, Webfoot Fertilizer Co., Portland; Elwood Lentz, Western Phosphates, Inc., Salt Lake, Utah; Ray Whitcomb, Link Distributing Co., Grandview.

Actual registration totaled 229, with 160 attending the annual banquet on Friday night. The equipment display in charge of Les Payant was very well attended, as were also all of the sessions.

The board of directors, upon the recommendation of the combined Scholarship Committee chairmen, voted to raise the scholarships given to outstanding students in soils at Oregon State College; Washington State College; and University of Idaho, from \$100 to \$250 each.

The Board also approved \$1,000 for experimental plots in Oregon this coming year. The plan calls for "on-the-farm" experimental plots in five counties in Oregon. Complete information will be sent out in the near future.

India Awards Madras Plant

Contract for \$21,000,000

To Three Prime Contractors

Neyveli Lignite Corporation Private, Ltd. Madras, has entered into a \$21,000,000 contract with Montecatini and Ansaldo for the construction of the world's largest urea plant. Neyveli Lignite Corporation acted on behalf of the Indian government in the negotiations for the plant which falls within the framework of the second five-year plan for the development of industry in that country.

The Neyveli installation, to be designed and built by Montecatini, will have a capacity of 300 daily tons of anhydrous ammonia and will employ the Fauser-Montecatini process for urea manufacture. It will operate on the "total recycling system" and will be the first plant in the world to transform all the ammonia exclusively into urea. Completion is planned for late 1962, with an anticipated on stream date in early 1963.

Plant site will be near a large lignite mine which will be equipped with an extraction unit to supply approximately 500,000 tons per

year of raw material. Specialized units, supplied by the German firm of Pintsch Bamag under a separate agreement, will be installed to handle drying and treatment of the lignite, its transformation into gas, and final purification. Another agreement with Linde will cover the installation for the fractional distillation of the air and gas for the gas synthesis mixture. The 300 daily tons of anhydrous ammonia will be used in the Fauser-Montecatini urea process.

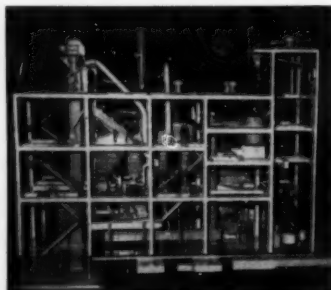
Construction of a thermoelectric power plant, research laboratories, work-shops and auxiliary service units, including a plant for packaging and handling the finished products, will make the Neyveli installation a completely integrated and self-sufficient operation.

According to the agreement, provisions have been made for the Indian engineers and technicians who will operate the plant to undergo training periods in Italy and Germany to acquaint themselves with the equipment and processes involved.

-of This and That...

Dr. O. E. Potier, director of mining operations at Pocatello, Idaho, for J. R. Simplot Co., told the American Mining Congress during its recent meeting in Denver, that the inter-mountain phosphate belt is producing at the rate of two and one-half million tons of "rock" annually. He also said that the phosphate deposits in Utah, Idaho, Wyoming and Montana contain 60 per cent of the nation's reserve of phosphoric. "These deposits have been known for 60 years, but only in the last 15 years has any widespread interest been shown in them," he added.

"We may wake up some day to find Mr. Khrushchev ahead of us not only in Sputniks, but in cottonnik, cornik, wheatnik, and pigniks and our country suffering both in quantity and quality of its agricultural production." This was the fear voiced to the Agricultural Research Institute at their recent Memphis meeting, by George Buck, Memphis, research assistant to the executive vice president, National Cotton Council. He noted that agricultural research: (1) has failed miserably to keep pace with research in other fields; (2) is not getting the kind of support it needs either from government or from the very groups with the greatest stake in its future; and (3) is suffering from a lack of public relations effort.



Pictured here is one of the two models exhibited in a presentation at the Fertilizer Industry Round Table last month (see page 23). The Dorr-Oliver delegation that brought the models by rented truck from Stamford, Conn. had a real tale of woe about getting on a freeway where trucks were prohibited, being stopped for running without taillights, and about holding their breath every time they hit a bump . . . listening to hear whether anything fell off the models each time.

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MANGANESE (Mn) ----- not less than 58%
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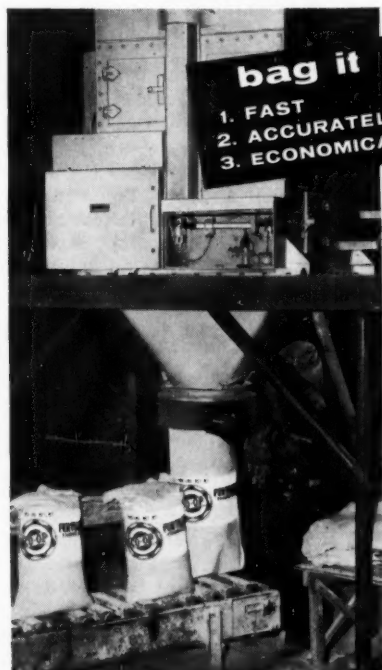
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Richardson HA-39
Fertilizer Bagger

Any fertilizer manufacturer using a Richardson HA-39 Bagger can check off all three as well done! Richardson leads the field in all requirements for fertilizer bagging equipment. Here are some of the reasons you can look to Richardson for more efficient fertilizer production.

The Leader!

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ARIZONA

Arizona Fertilizer & Chemical, Phoenix, whose name change and establishment of the Cortez Chemical subsidiary were reported here last month, is offering 100,000 shares of \$2.50 par value stock in AF&C at \$9 a share. Proceeds will be partly used to liquidate short term debt and the remainder to increase production capacity of Cortez Chemicals. At the completion of this operation a third of the million authorized shares will still be outstanding. The company shows fiscal year net sales at six million, and a net after taxes of \$209,946.

◆ ◆ ◆
Marchen Products Co., Inc., Phoenix, has been incorporated at \$100,000 to manufacture various plant foods and pesticides. Officers: Gerald D. Sattler, chairman; Edward L. Levson, president; Jack Hill, secretary-treasurer.

◆ ◆ ◆
William Thorpe, Phoenix, has established the A-1 Fertilizer Co.

◆ ◆ ◆
Tristate Enterprises, Phoenix, has been incorporated for \$1,000,000 to buy, sell and deal in chemicals and fertilizers. Officers: Joseph B. Jencakes, Jr., president; James M. Bush, vice-president; James Powers, secretary-treasurer. The plant is to be established "in Maricopa County."

◆ ◆ ◆
Valley Fertilizer Company, Phoenix, has been incorporated for \$100,000 to manufacture and sell at both wholesale or retail and to apply fertilizer. Incorporators: Gene M. McKinley, John F. Swartz.

CALIFORNIA

Stauffer Chemical has completed plans to build a major research center at Richmond, located on a 10 acre tract recently acquired by the company, adjacent to the present Richmond plant and research laboratories.

Construction of the first unit of the new research center will begin in January. Completion of this initial laboratory, which will cost about \$1,600,000, is scheduled for early 1961.

The existing research facilities at Richmond will be used to expand process development and pilot plant activities. Stauffer also operates research laboratories at Los Altos, California, Chauncey, N. Y., Weston, Michigan and Houston, Texas.

◆ ◆ ◆
Collier Carbon & Chemical will build a multi-million dollar, two-



unit facility for the production of sulphuric acid and ammonium sulfate near Wilmington, on the 11-acre site they have under long lease from Union Oil. The new ammonium sulfate plant, according to president Robert T. Collier, will out-mode and replace Union's present refinery facilities. Both units are due to go into production late next year.

DELAWARE

SunOlin, subsidiary of Sun Oil and Olin Mathieson, expects to be in production early next year with its \$8,000,000 urea plant in the Delaware Valley.

FLORIDA

Florida Fertilizer has begun construction of a \$90,000 plant at Wauchula. Equipment will include a 1 ton batch mixer capable of 25 hourly tons of dry mixing; bagging and bulk loading facilities. There will be storage for 1500 tons of bulk and 400 tons of bagged goods. Edgar L. Davis is president; W. Albert Carlton is secretary-treasurer. Superintendent will be Merle Boone when the facility goes into production about March.

◆ ◆ ◆
Davison Chemical has awarded contract for the engineering and construction of a Monsanto contact sulphuric plant at Bartow to Leonard Construction Company. The plant, which will have an initial rated production capacity of 400 daily tons with built-in facilities for additional expansion as required, will use elemental sulphur as a raw material.

The acid will be used to supplement Davison's present production of fertilizer materials. Construction will begin immediately, a Leonard official said, with completion scheduled for August of next year.

IDAHO

Henry Ankeny Co., with headquarters and a warehouse in Nampa, and another warehouse in Notus, will soon put into operation a newly

built bulk fertilizer operation, with 500 tons storage capacity, in Marsing. Ralph Bowman, manager, is also half owner of this unit. The new unit, a production operation, contains 3,800 square feet of floor space, and was added to the existing warehouse.

IOWA

Consumers Cooperative has purchased the liquid fertilizer plant at Humboldt owned Lowell Sandven. For details see "Changes."

◆ ◆ ◆
Federal Chemical Co. has begun a \$125,000 expansion program at its Humboldt plant, including the additions of a pelletizing operation and 13,000 square feet of new plant floor space.

KENTUCKY

Glasgow Fertilizer Company, Glasgow, completed last month and had in operation a new structure on an 11.8 acre tract.

LOUISIANA

Warren & Coody, Lake Providence, have been incorporated as a seed and fertilizer concern with listed capital stock at \$100,000.

MISSISSIPPI

Coastal Chemical has shipped a fertilizer cargo valued at nearly \$1,000,000 from Pascagoula. This is the first non-wood product export shipment from that port. The high analysis mixed fertilizer is going to Colombia, where a government agency will handle distribution to farmers.

NEW JERSEY

Dixie Chemical has opened at Paulsboro the largest sulphuric acid plant of its kind in the world. It cost more than \$5,000,000, is capable of 300,000 annual tons. President A. W. Dixon, Jr. says this is just the start of a 70-acre chemical complex, with a \$4,000,000 hydrofluoric acid plant coming in late 1960.

OHIO

Green-Leaf Fertilizer has sold its plants at Lockwood and Andover to Central Chemical Corp. For details, see "Changes."

TENNESSEE

Grace Chemical has announced a major expansion of their nitrogen plant in Woodstock near Memphis. Present capacity of the plant is 100,000 annual tons. The new capacity will bring the ammonia production total to more than 160,000 annual tons.

This program follows in the wake of an expansion of the urea section which doubled urea production during this Fall from 50,000 annual tons to 100,000 tons. This makes the plant the third largest in the United States and the fifth largest in the world. President W. J. Haude said ammonia construction will get underway soon and he expects completion of the enlarged section by 1961.

While contracts for this plant have not been let, an announcement will be made shortly concerning the engineering and construction firms that will build the new plant. It is expected that the expanded facilities will parallel the present 300 daily tons ammonia train and economies will be realized from operating integration although the new ammonia train will be capable of independent production of ammonia. The process selected for the new plant consists of five major process steps as follow:

1. Primary and secondary high pressure (130 lbs. per sq. inch) steam methane reforming.
2. Two steps of carbon monoxide shift conversion, each followed by a stage of carbon dioxide removal by monoethanolamine.
3. Methanation of residual carbon monoxide.
4. Synthesis gas compression.
5. 9,000 lbs. per sq. inch Casale ammonia synthesis.

An interesting feature of the new plant is an all-polyethylene cooling tower to be constructed by Fluor Corp. from Grace's own high density poly.

◆ ◆ ◆

Federal Chemical is adding in Humboldt a 13,000 square foot structure and pelletizing equipment, which will run to \$250,000. The Louisville based concern has operated in Humboldt since 1935.

TEXAS

Dow Chemical's Freeport expansion programs is scheduled for comple-

tion early next year, producing ammonia from by-product hydrogen and N from the atmosphere.

WISCONSIN

Agrico has established at Johnson Creek a warehouse and bagging operation, and plan to manufacture there at a future date. This takes care of short-haul supply to Wisconsin farmers who have previously been supplied from East St. Louis and Fulton, Ill. American Agricultural Chemical manufacturers at 39 locations east of the Missouri River and in Kansas.

CANADA

Alberta Pacific Sulphur Co. backed by undisclosed U. S. interests may build a \$12,000,000 sulphur recovery plant in the Panther River area, Alberta, which could match eventually "the entire sulphur production from natural gas in the U. S. and Canada." This was, last year, 750,000 tons. They plan production of 350,000 annual tons.

◆ ◆ ◆

Cyanamid of Canada is in production with its multi-million dollar urea plant at Hamilton, Ontario, which gets its raw materials from a neighboring steel mill and is built on reclaimed land. President Dr. L. P. Moore says it is Canada's first urea facility.

The plant will have a rated production capacity of 66,000 annual tons of urea. Anhydrous ammonia will be produced at the rate of 52,500 annual tons, with most of it being utilized in the production of urea and approximately 12,000 tons available for other purposes.

Construction was started in 1957 and was carried out by Chemical Construction Company of New York. Overall employment under production conditions will be approximately 100.

Cyanamid of Canada Limited has its headquarters in Montreal, and also operates two plants in Niagara Falls and one at Beachville in Ontario, as well as at Montreal and St. Jean in Quebec.

◆ ◆ ◆

Border Chemical Co., Ltd. Winnipeg, has announced plans to build a sulphuric acid plant in North Transcona at a cost around \$1,000,000 an investment shared by local and U. S. capital. Production is expected by April of next year, according to the company's president, Mark Smerchanski. Chemical Construction Corp has been retained to design the plant which is expected to turn out 50 daily tons.

FRANCE

Sintec and DuPont have established

in Alsace a joint operation to produce urea herbicides. 70% will be sold in France, which has been DuPont's most important export market for monuron and diuron herbicides. The remainder will go into European Common Market channels, via DuPont's operation in Switzerland.

JORDAN

Jordan Phosphate Mines Co. Ltd. Amman, has signed with the U. S. Government a \$1,500,000 loan agreement which will permit them to expand mines to nearly double present output, and eventually to three times present figures.

MEXICO

Guanos y Fertilizations will build the first of several ammonium sulphate plants in the Coatzacoalcos, Salamanca and Guanajuato areas, and in another location not yet designated, authorized by President Mateos, and for which a total of 78,000,000 pesos (\$6,000,000) has been earmarked.

The company also plans to produce calcium triple supersphosphate in the near future, in the plant which is being built in Veracruz at an estimated cost of \$4,280,000. In full production this will turn out 50,000 annual tons.

NORWAY

Norsk Hydro, Notodden, forced to shut down recently by a water shortage and consequent reduction of electric power, is expediting production above previous records, to catch up.

PAKISTAN

Fenchugan, the new East Pakistan fertilizer plant, is now about 25% completed, and the outlook now is for initial production of 135,000 annual tons to begin in November, 1961.

SPAIN

Refineria de Petroleos de Escombreras has \$10,000,000 to build a nitrogenous fertilizer plant at Cartagena, and **Union Espanola de Explosivos and Sociedad Iberica del Nitrogeno** has the remaining \$7,620,000 of a loan to build at Seville. The plants should have a total output of 65,000 annual metric tons of NPK—which is more than Spain's entire 1958 production. The loans were made with the aid of the U. S. Export-Import Bank.

YUGOSLAVIA

Lukavac coking plant, Tuzla, will have as a neighbor a plant to produce 125,000 annual metric tons of ammonium saltpetre fertilizer, using waste gases from the coke plant.

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More Clupak Producers

Clupak, Inc., announces two new producers of their extensible paper, both for multiwall bags and general converting: Continental Can Co. has installed a unit on its 246-inch wide machine which has a capacity of 250 daily tons.

St. Regis has begun production at Pensacola, on a 212 inch machine turning out 180 daily tons. Other units are already in commercial operation by West Virginia Pulp and Paper, International Paper, St. Lawrence Corp., Union Bag-Camp and Albemarle Paper.

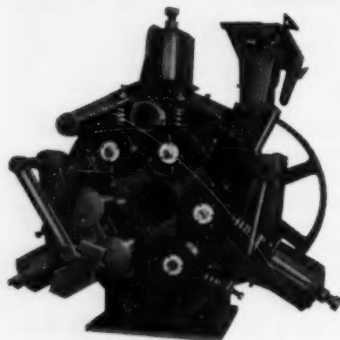
—ANNOUNCEMENT—

Official Publication No. 13 issued by the ASSOCIATION OF AMERICAN FERTILIZER CONTROL OFFICIALS will be available for distribution at \$2.00 per copy (discounts in lots of 100 or more) December 15, 1959, through the office of Secretary-Treasurer, B. D. Cloaninger, P. O. Drawer 392, Clemson, South Carolina.

The publication includes official definitions of all fertilizer terms, grouped by principal plant food ingredients, names, addresses and telephone numbers of all Fertilizer Control Officials, and papers of those who appeared on the program of the Association this year.

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